

SCIENCE

FRIDAY, JANUARY 18, 1889.

THE WHITE ELEVATED ELECTRIC RAILROAD.

THE crowded state of the streets of our great cities, and the increasing necessity of greater facilities for travelling safely through them with speed and comfort, have brought to the front many devices for solving the problem of rapid transit. One of the most recent of these is the elevated railroad lately invented by Mr. R.

which are only called into play in case of an undue oscillating or rocking motion of the car resulting from obstructions or too great speed, are safeguards against the car leaving the track. They also enable the car to pass around curves of short radii at a reasonable speed without danger of derailment.

The plan and cross-section of a box girder for supporting the main bearing rail is shown in Fig. 1. This is only one of many methods which may be used for sustaining the weights of heavy trains at high speeds; another support, shown in Fig. 2, being an I

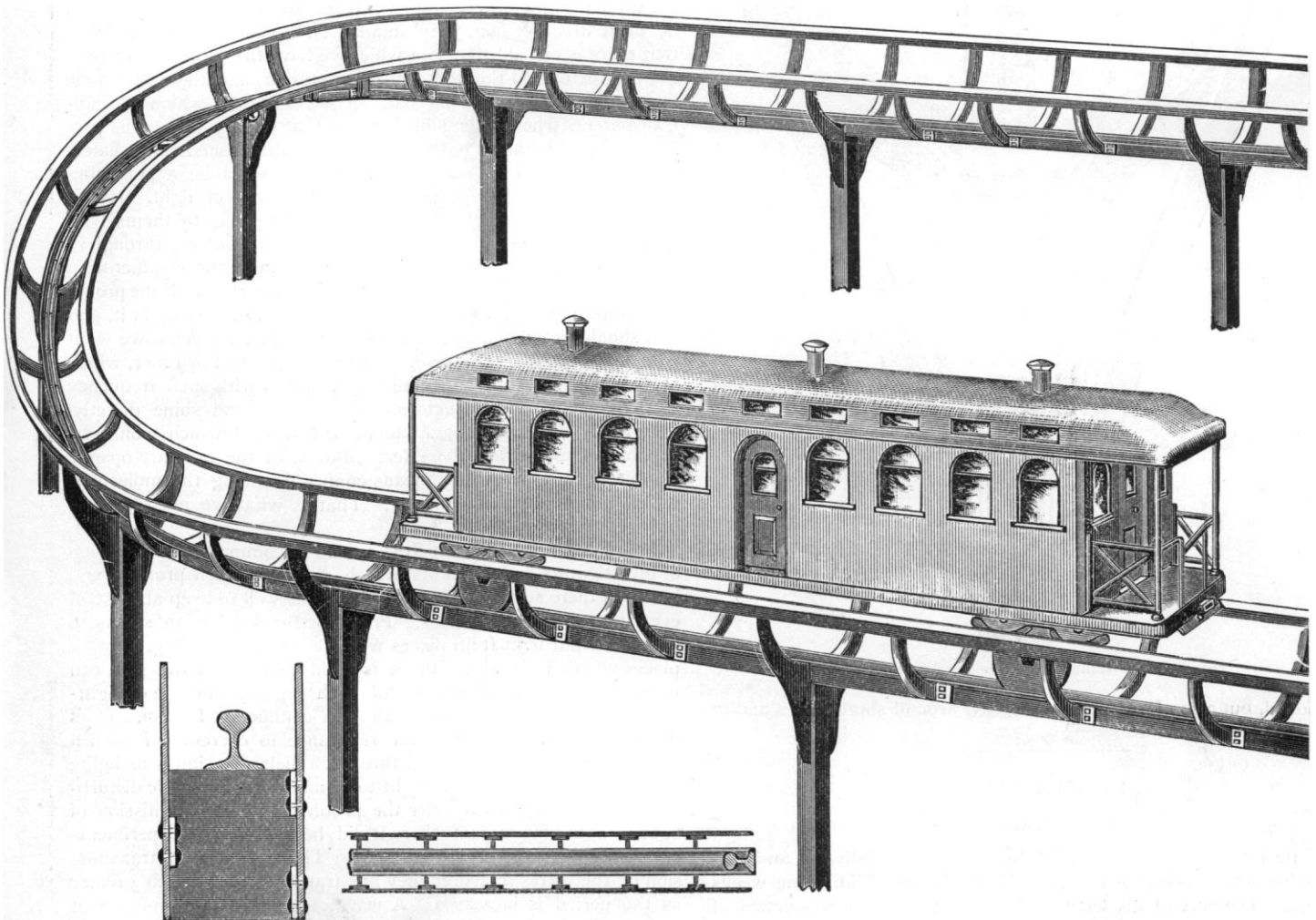


FIG. 1. — THE WHITE ELEVATED RAILROAD.

T. White of Boston, of which we present herewith two illustrations; one being a general view of a car, with a section of the roadway, including a short curve, and the other showing some details of the truck and track. In his elevated railway system, Mr. White has embodied the results of much railroad experience and many interesting experiments. As may be seen in the illustration (Fig. 1), the track is supported by a single line of columns. The car rests upon two wheels (one at each end), instead of upon eight (four at each end), as in the ordinary passenger-car. The car is steadied horizontally by eight guide-wheels (four at each end), assisted by small rollers, one projecting from beneath each guide-wheel (Fig. 2), and having an upward bearing against the side-rails, which form the horizontal guides for the car-trucks. These guide-rollers,

beam resting upon the columns. Trusses of various forms may also be used; the method of support, as well as the height and distance apart of the supporting columns, being determined by the varying local conditions.

One difficult problem in the perfecting of this system of road was that of switching; but Mr. White claims to have not only solved the problem, but to have made the arrangement of the switch such that the track is never open, even should the switch be turned the wrong way, as the bearing-wheels can never leave the supporting-rail, and consequently the car cannot leave the track.

This system of elevated railroad, though intended primarily for an electric road, may use steam or cables. As yet, we believe, there is no road in operation constructed upon Mr. White's system,

though large working models show the feasibility of not only running trains upon such a track by any of the motive powers men-

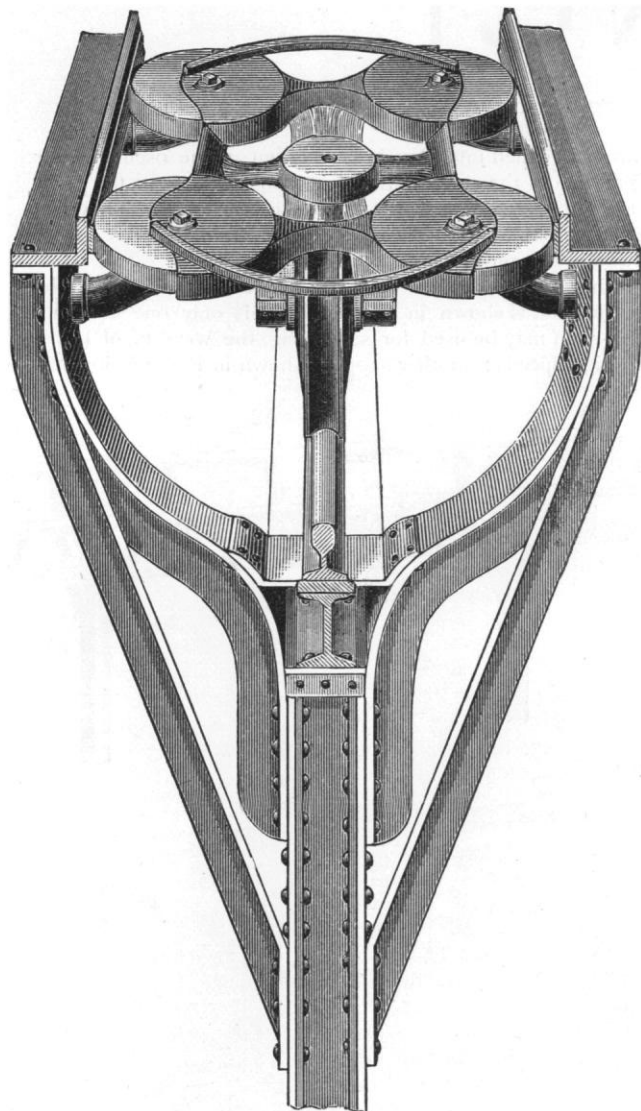


FIG. 2. — THE GUIDE-WHEELS OF THE WHITE RAILROAD.

tioned, but also of running them safely around short curves and at high speeds.

ELECTRICAL NEWS.

Light without Heat.

PROFESSOR BRACKETT of Princeton College delivered an interesting address before the New York Electric Club some weeks ago. The part of his lecture which treated of the production of light without heat gave an admirable summary of Dr. Hertz's experiments on electro-magnetic waves, and afterwards Professor Brackett indicated the lines on which he thought it would be best to experiment to obtain practical results. Briefly the state of the case is this: light consists of electro-magnetic vibrations of a definite and very short period. In our ordinary methods of artificial illumination we produce vibrations of a period that will affect the eye, by heating particles to incandescence, the resultant vibrations being of a great number of periods, only a few of them being of use for illumination. In fact, a great deal of energy is wasted, only a very small proportion of the total appearing in a form that is useful to us. Now, the problem that is presented is to produce vibrations of the period we want, and no other; and the problem is a very difficult one to solve. In nature there are phosphorescent substances and certain insects — glow-worms, fire-flies, etc. — which are very efficient illuminants, the light produced

being accompanied by very little heat: so the problem is not impossible, and we may regard it hopefully. The most serious difficulty lies in the extreme rapidity of the oscillations required, billions of them a second, — a rapidity so great that it seems impossible to attain it by any mechanical means. Nor would it be possible to economically distribute the vibrations when they were produced.

Professor Brackett proposes to solve the problem by working it backwards, to take a beam of light, polarize it so that all of its vibrations are in one plane, and "harness that to a wire, so that it will make a current vibrate and also make the magnetic field about the wire vibrate: in other words, if you cannot do the sum, take the answer and work backwards. That is what I intend to do, and I will hint to you exactly how I propose to do it. It cannot be done with the ordinary materials employed for conductors, if it has to heat the wire. . . . We must get something that is not a conductor in the ordinary sense. I remind you that the amount of energy expended in the movement in the high vacuum tube, in the ordinary tube, where you have the most beautiful illuminations, is, in matter of fact, very small. . . . I point out to you next that there is one substance in which we have the properties of both the conductor and the non-conductor present, and there are some very hopeful indications in that. A selenium cell, which is semi-transparent, when it is joined up and a battery current is put through it, is found to have its resistance diminished immediately a flash of light falls on it. . . . Suppose we take a polarizing apparatus by which we can polarize a long web of light. It will consist of vibrations all sorted out in parallel planes by themselves. . . . Now let this polarized web of light be passed through a narrow slit so as to pass directly upon or near the conductor in which we wish to set up an alternating electric current. If the proper conductor can be found, it should have the current set up in it, and this should produce a magnetic field about it. . . . What we want is an alternating current or discharge of some sort or other, which shall enable us to produce the alternations with such frequency that the so-called conductors will break out and shine directly. . . . A dynamometer ought to be constructed which would be capable of measuring the effect. But with the ordinary opaque conductor, such frequency means confusion among the molecules, which brings about a difficulty. That is what we must get rid of."

In a subject like this, which is certain to command the attention of investigators and inventors, which gives so much promise, and in which there seems no impossibility, it is well to keep abreast of even the suggested solutions. Professor Brackett's plan seems to be to transmit light from places where the sun is shining, to other places where it is not. But it is hard to see how this plan can work successfully. Vibrations of such rapidity as those of light-waves cannot be transmitted along a conductor, for conductors would offer a practically infinite resistance to currents of such a period. They are transmitted through a dielectric simply as light; and the fact that we believe light to be an electro-magnetic disturbance does not help us to solve the problem. The transmission of light as such stands just where it did before Hertz's experiments or Maxwell's theory were published. The efficiency of transmission of the waves, however they are transmitted, is much greater as the period is increased. A wave of a period some millions of times less than that of light might be transmitted from China here without much loss, provided we did it properly, while the energy of a light-wave would be dissipated before it had gone a mile. If we wish to transmit light, we must reduce the vibrations to a greater period at the sending station, and raise them again at the receiving end; and this will be difficult. If we wish to produce light, we have little encouragement in the line of producing an electric wave of the required period by mechanical means. The period of vibration of a charge of electricity, displaced on the surface of a sphere of a centimetre radius, might be a thousand million a second; but to reach the millions of millions necessary for light, the size of the sphere would have to be decreased until it had reached molecular proportions. We have in nature, however, instances of the kind of action we wish. In glow-worms and fire-flies the results we are attempting to attain are reached, and we need not despair of a problem the solution of which is called to our attention on almost any

summer's night. But the line sketched out by Professor Brackett offers, we think, only a very slender hope of accomplishment.

NEW SECONDARY BATTERIES. — Hardly a week passes but we read of some new secondary battery that is to be introduced. This state of affairs has a promising side and an unpromising one. It shows the great need of some reliable storage-battery, and it brings out the fact that a great number of people are working at the problem of finding one. Some of these new cells compare very favorably with the older and better-known types; some of them are, in all probability, not so good. One of the newest is the Johnson battery, which is to be manufactured in Boston. Special advantages are claimed for it, but no figures are given, nor is it anywhere fully described. Two other batteries have been recently put on the market, — the Macrean and the Detroit. We hope to publish some figures as to the latter at an early date: it is a promising type of cell. It is to be hoped that a year which opens with such activity in storage-battery circles will develop some cell that will make electric traction in our crowded cities practicable.

IS A VACUUM AN ELECTRIC CONDUCTOR? — Some time ago M. Foepl made some interesting experiments on the conductivity of a vacuum; his results tending to show that a vacuum is an insulator, or, at best, its conducting-power is very small. The experiment has been described in this journal. Briefly it consisted in making a galvanometer whose coils were made of glass tubing from which the air had been exhausted, and connecting it with the secondary of an induction-coil, also constructed of glass tubing. There was no inductive effect observed when a current was sent through the primary of the coil, even when the electro-motive force induced had a value of 5,000 volts. M. Foepl concluded then that an absolute vacuum would be a non-conductor, and that ordinary vacuum-tube phenomena are caused by convection. Some of his more recent experiments tend to throw some doubt on these conclusions. He placed an exhausted tube within a solenoid through which he sent a Leyden jar discharge. Luminous phenomena took place, as in an ordinary vacuum tube provided with electrodes, at which an electro-motive force is applied. We know so little, however, of the nature of luminous discharges in vacua, that we can hardly consider the evidence of the last experiment so strong as that of the first; and while it may be possible to account for either result on the hypothesis of the non-conduction, or on that of the conduction of a vacuum, the former seems much the more probable.

ELECTRIC LIGHT IN THE PATENT OFFICE. — From the report of the secretary of the interior, we learn that arrangements were made the past year with the assistance of Lieut.-Commander Bradford of the United States Navy (among the most expert of electricians), with the Brush Electric Light Company of Cleveland, O., for the construction of the necessary machinery, and the arrangement of wires, appliances, and lamps, for the Patent Office building, in order to light it completely. The department will be able to furnish its own light at so great a diminished cost, that it is believed the saving from the average annual outlay heretofore sustained will in three years reimburse the expenditure for the plant. There are such vast piles of public papers, records, and documents in the various rooms, halls, and cellars of the department, many of these so dark as to require light throughout the day, that a mode of illumination which is consistent with their safety becomes of prime importance. It is believed that this object has been most satisfactorily secured by the arrangements made under the direction of Lieut.-Commander Bradford. Secretary Vilas avails himself of the opportunity to express his sense of obligation for the great advantage enjoyed in the generous contribution of Lieut.-Commander Bradford's expert and valuable knowledge, from which he believes the electrical equipment of the department will hardly be equalled in the country for safety and efficiency, procured upon the most economical terms.

PROFESSOR N. S. SHALER of Harvard University is in Washington, on his way to the Dismal Swamp. He will there spend a fortnight in geographical and geological researches, in order to complete an article for the next annual report of the Geological Survey.

THE OBSERVATORY HILL RAILWAY OF ALLEGHENY CITY, PENN.

THIS railway has been in continuous operation since January, 1888, as an electric road. The line is about four miles in length. For one-fourth of this distance the electric conductors are contained in a sub-surface conduit. For the remainder of the line the conductors are elevated above the roadway, being bracketed off from poles erected along one side of the street. The conduit branches from double to single track, and at the present terminus of the line there is a conduit cross-over switch from down to up track. At different points along the conduit section the conduit cuts through five other street-railway tracks belonging to other companies.

On the elevated conductor section the line is single track with seven turn-outs. Double conductors are used throughout both conduit and elevated conductor sections, neither the rails nor any part of the conduit itself being used as a part of the electric circuit.

Nowhere throughout the whole line is there a space fifty feet long where a car will stand without the brakes being applied. There are thirty-four curves on the line, not including turn-outs or switches. The maximum grade is $12\frac{1}{2}$ feet in 100 feet. There is a total rise of 295 feet in 4,900 feet, with an average of about six per cent. The maximum grade of $12\frac{1}{2}$ is on a reversed curve (radii 100 and 200 feet). The sharpest curve has a 35-foot radius on five-per-cent grade.

The Bentley-Knight conduit system consists of a power station, — engines, boilers, and dynamo-electric machines; a conduit running the whole length of the line, containing the conductors which convey the electric current to the motors; and hanging connections (ploughs) which pass through the conduit slot, and, sliding along the conductors, maintain unbroken connection between the motors and the source of power. The electric conductors are accessible only to regular employees, furnished with special tools, while the current used, even in roads of the heaviest carrying capacity, cannot injure either life or property.

The conduit, which contains the conductors and supplies the current to the motors along the line, can be placed at any point where the opening of the slot will be below any part of the car-body. In constructing a conduit line, the iron yokes shown in the accompanying figure are set up from four to six feet apart, and the conductors set against the insulators which support them at each yoke. The electrical connection between the different lengths of conductor are then made, the slot-steels set on the yokes, and the slot-steels and yokes firmly bolted together, leaving a slot opening at the surface of the street of only five-eighths of an inch. Attention is especially directed to that form of Bentley-Knight conduit which permits the width of the slot to be regulated, the slot rails to be removed, and the conductors, insulators, and interior of the conduit to be inspected, without disturbing the pavement. The conductors are copper bars connected by expansion joints, and are of sufficient size to carry the current with a loss never greater than five per cent. The fact that the conduit can swerve from a straight line to avoid obstructions, and can be laid outside of the track wherever desired, greatly decreases the expense and difficulty of laying.

Electrical connection between the motor and the conductors in the conduit is effected by a contact-plough, which consists of a flat frame, hung from the car by transverse guides (on which it is free to slide the whole width of the car), and extending thence down through the slot of the conduit. It is so constructed as to adjust itself to all inequalities of road or conduit. This frame carries two flat insulated conductor-cores, to the lower ends of which are attached, by spring hinges, small contact-shoes, which slide along in contact with the two conductors in the conduit. At the upper ends are attached connections leading to the motor. This plough can be inserted or withdrawn through the slot at will, the spring hinges allowing the contact-shoes to straighten out into line with the conductor-cores when the plough is pulled upward. By no accident, therefore, can any thing be left behind in the conduit to obstruct succeeding cars. The plough-guides are hung on transverse axes, and are held in a vertical position by a spring-catch that gives way when the plough meets an irremovable obstruction, and allowing the plough to be thrown completely out of the conduit without injury, it being also immediately replaceable. The frame of the

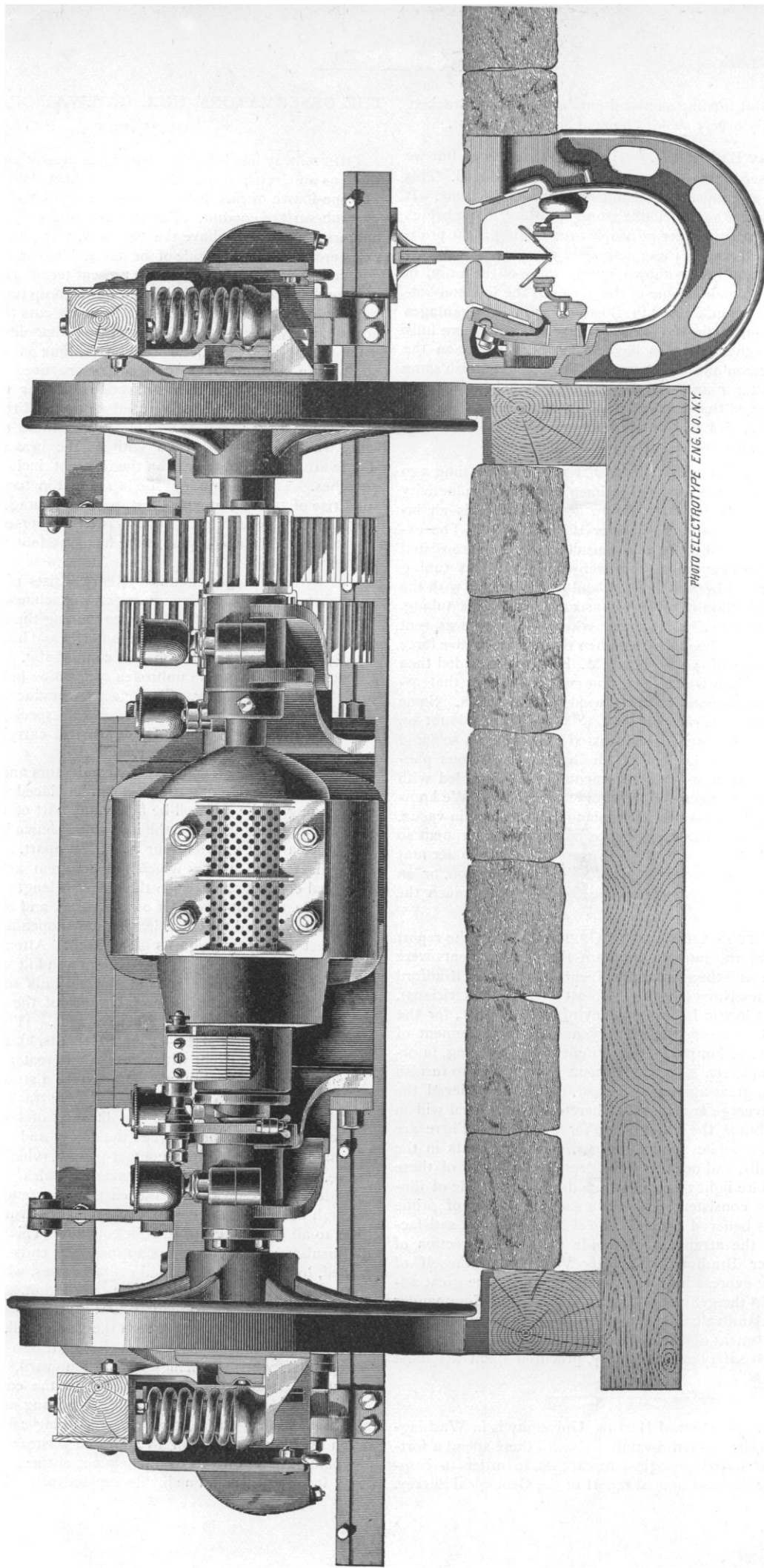
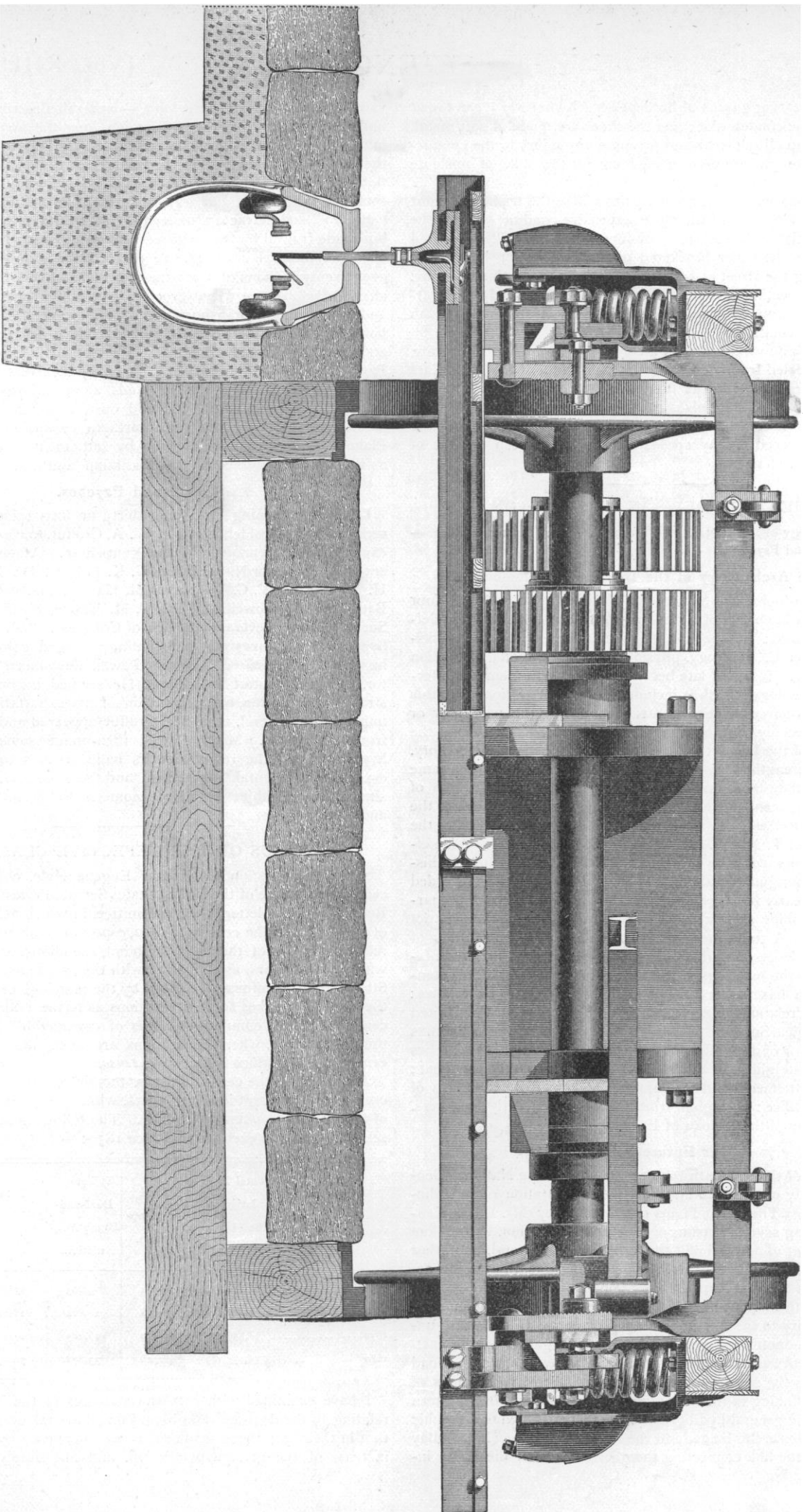


PHOTO ELECTROTYPED ENG. CO. N.Y.

BENTLEY-KNIGHT STANDARD MOTOR TRUCK, CONDUIT, AND PLOUGH (FRONT VIEW).



BENTLEY-KNIGHT STANDARD MOTOR TRUCK, CONDUIT, AND PLOUGH REAR VIEW.

plough has wearing guards of hardened steel wherever it can touch the edge of the conduit slot; and the shoes are made of soft metal, which takes up all the wear and prevents any injury to the conductors. Two ploughs are used on each car for the sake of absolute reliability.

For suburban lines, or for small cities where the traffic does not justify the employment of the more expensive conduit system, the company furnishes its elevated conductor system. The elevated conductors can be either bracketed off from poles, or hung from wires crossing the street at any desired height above the roadway. Electrical connection between the motor on the car and the elevated conductors is maintained by means of a trolley or contact-brush and a flexible conductor.

The motor and mechanism of a car operate noiselessly, and are entirely concealed from view beneath the bottom of the car. Cars may be stopped as quickly as desired, may reverse at will, and, if derailed, can propel themselves back on the track.

The motor is controlled from either end of the car; and the driver may proceed at any speed, from a slow creep to that of twenty miles an hour.

SCIENTIFIC NEWS IN WASHINGTON.

The Archæology of the District of Columbia. — Our Future Empire. — Science and Psychos.

The Archæology of the District of Columbia.

THE Anthropological Society of Washington consists of four sections, each in charge of a vice-president, but none thus far definitely organized: viz., Section A, somatology; Section B, sociology; Section C, philology, physiology, and psychology; Section D, technology. It has of late become apparent to members interested in archæology (which is included in the last section) that this subject has received inadequate attention during the past year or two, and especially that too little attention has been given to the archæology of the District of Columbia and contiguous territory. In order to strengthen this branch of anthropology, and at the same time to stimulate local investigators, a temporary organization of Section D has been effected. At a meeting of the members of the society interested in local work, called by the vice-president of the section, Dr. O. T. Mason, last week, it was decided to combine efforts and results, with the immediate object of elucidating the history of the aboriginal inhabitants of the Potomac River as recorded in relics and early writings, and with the ultimate object of preparing and publishing a monograph on the antiquities of the District of Columbia. A committee was appointed to prepare *résumés* of existing knowledge on various phases of the subject for presentation at one of the meetings of the society in April next. This committee, which has power to add to its numbers, is as follows: geology in its relations to early man, W. J. McGee of the United States Geological Survey; paleolithic man and his remains, Thomas Wilson, curator of antiquities of the Smithsonian Institution; relics of the later aborigines, S. V. Proudfit of the Interior Department; prehistoric settlements and workshops, Dr. Elmer R. Reynolds of the Pension Office; aboriginal tribes recorded by early explorers, James Mooney of the Bureau of Ethnology.

Our Future Empire.

The event of the sixteenth regular meeting of the National Geographic Society on the 11th inst. was the presentation of an elaborate paper on "The Great Plains of Canada," by Mr. C. A. Kenaston. During several seasons of constant exploration, undertaken with the object of ascertaining the agricultural, pastoral, and other capabilities of the country, Mr. Kenaston became thoroughly acquainted with the vast expanse of plain country stretching from Hudson Bay to the foot-hills of the Rockies, and from the international boundary to the Arctic Circle. The entire tract is one uninterrupted, monotonous, grassy plain, sloping gently to the eastward and northward, diversified only by shallow lakes and broad water-ways in the east, and by shallow but steep-sided cañons of the rivers beginning in the mountains in its central and western portions. The general hydrography, the more detailed topographic features, the flora, the fauna, and the *voyageurs* of the Hudson Bay Company, — the link connecting the aborigines with the white in-

vaders who now possess the land, — were all described at length; and it was pointed out that this region, long the home of the buffalo, the wolf, the badger, and uncounted myriads of wild fowl, is the American wheat-field of the future. In the south-eastern portion of the tract the soil is a dark prairie loam, like that of Minnesota and Iowa; west and north-west of it lie millions of acres of "gumbo" soil, refractory under the first efforts of the agriculturist, but made fruitful by two or three seasons of tillage; while the soil of the northern plains is a fertile yellow loam or boulder drift; and over twenty millions of acres the conditions of soil and climate are alike so favorable to wheat-growing, that only peopling by farmers and the opening of transportation routes are needed to make any part of it successfully rival the famous wheat-fields of Minnesota and Dakota. Already the tract is intersected by the Canadian Pacific and many other railways, the navigable rivers are being supplied with steam-craft, and the lands along railways and waterways are generally sectionized and open to occupation; and the present prospects are that this northern expansion of the Great Plains of America will be overrun by settlement nearly as rapidly as was the part drained by the Mississippi and its tributaries.

Science and Psychos.

On Friday evening last, some thirty or forty scientific men assembled at the residence of Mr. W. A. Croffut, to "assist" at some experiments in hypnotism by that gentleman. Among those present were Professor N. S. Shaler, G. K. Gilbert, Dr. T. N. Gills, A. H. Thompson, W. C. Winrock, Col. Garrick Mallery, Gen. Adam Badeau, Major Powell, and Mr. F. M. Thorn, chief of the Coast Survey, besides several members of Congress. While one of the hypnotized sensitives was personating an aged colored preacher, he was violently seized by Major Powell, denounced as an impostor, and thrust out of the room. He seemed unconscious of the strange interruption, and the stream of his exhortation flowed on unbroken to the end, until Mr. Croffut appeared and recalled him from the trance. Major Powell then made some remarks on hypnotism and the relation of its hallucinations to other states, especially to mental abstraction and heterophemy, and the desirableness of subjecting its phenomena to scientific conditions and observation.

CENSUS OF THE DEFECTIVE CLASSES.

At the suggestion of Senator Eugene Hale, chairman of the census committee of the United States Senate, Professor A. Graham Bell addressed a letter to the committee, in which he refers to some of the results of the census of 1880, especially with reference to the relative increase of the deaf, the blind, the idiotic, and the insane within recent years, as compared with the population in the United States, and to deafness as caused by the marriage of the deaf with the deaf, and makes some suggestions as to the taking of the next census. As this communication is of considerable importance at the present time, when preparations are being made for the next census, we reproduce it here *in extenso*.

According to the census returns, the defective classes have increased 400 per cent in thirty years, while the general population of the country has simply doubled. The following table shows the relative figures at each census since 1850:—

Years.	Total Population of the United States.	Total Blind Population.	Total Deaf-and-Dumb Population.	Total Idiotic Population.	Total Insane Population.
1850.....	23,191,876	9,794	9,803	15,787	15,610
1860.....	31,443,321	12,658	12,821	18,930	24,042
1870.....	38,558,371	20,320	16,205	24,527	37,432
1880.....	50,155,783	48,928	33,878	76,895	91,997

I have examined with care the statistics of the Tenth Census relating to the deaf-and-dumb, and find internal evidence to show that in their case there has been a real increase greater than the increase of the general population, and not simply an apparent

increase due to greater accuracy of enumeration: for, when the whole population of the United States are classified according to their age in 1880, the proportion of deaf-mutes among the younger persons is seen to be greater than among the older; indeed, it is proportionally greater as the age is younger, until quite young children are reached.

The following are the number of the deaf-and-dumb returned in the Tenth Census:—

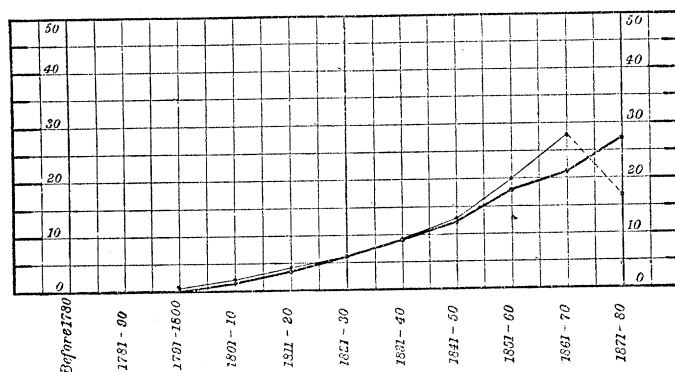
Period when Deafness occurred.	Number of Deaf-Mutes.
At or before birth	12,155
After birth	10,318
Not stated.....	11,405
Total.....	33,878

Classification of these cases according to their age in 1880 shows that there has been an enormous increase of recent years in the numbers of the non-congenitally deaf; but this need hardly be considered as a permanent condition, for it appears to be due to an epidemic of cerebro-spinal meningitis, which will probably die away, as former epidemics have done.

The following table shows the percentage of the whole population of the United States born at each decade, and also the percentage of the congenitally deaf population:—

Period of Birth.	Total Population Living in 1880.	Congenital Deaf-Mutes Living in 1880.	Percentage of the whole Population Living in 1880.	Percentage of Congenitally Deaf Population Living in 1880.
Before 1780.....	4,016	—	0.0080	—
1781-90	20,863	9	0.0416	0.074
1791-1800	106,197	63	0.3912	0.518
1801-10	776,507	241	1.5482	1.983
1811-20	1,830,095	472	3.6488	3.883
1821-30	3,111,317	751	6.2033	6.179
1831-40	4,558,256	1,078	9.0882	8.870
1841-50	6,369,362	1,614	12.6992	13.280
1851-60	9,168,393	2,460	18.2798	20.240
1861-70	10,726,601	3,398	21.3866	27.958
1871-80	13,394,176	2,068	26.7051	17.015
Total.....	50,155,783	12,154	100.0000	100.000

These results are shown in graphical form in the following diagram. The continuous line indicates the percentage of the general population, and the broken line that of the congenitally deaf population, born at each decade.



The indications are that the congenital deaf-mutes of the country are increasing at a greater rate than the general population.

The great and sudden decrease in the numbers of deaf children born in the last decade (1871-80) is probably due to imperfect returns of deaf-mutes under ten years of age: for, though 54 per cent of all the deaf-and-dumb were deaf from birth, only 30 deaf infants were reported in the census of 1880, and only 49 between the ages of one and two, out of a total deaf-mute population of 33,878.

Statistics in my possession show that in the year 1819 deaf-mutes began to marry partners who were themselves deaf-and-dumb.

The percentage of intermarriages has continuously increased, until now not less than 90 per cent of all deaf-mutes who marry, marry partners who are themselves deaf-and-dumb.

The latest statistics collected by me include 1,443 cases of marriage. Of these 1,443 deaf-mutes, I find that 71 (or 5 per cent) had married hearing persons, and 1,372 (or 95 per cent) had intermarried among themselves.

In 1828 a deaf-mute child was born of a deaf-mute father and mother, and now such cases can be numbered by the hundred. My statistics are based upon a list of 528 deaf-mutes, mostly young, who have one or both parents deaf.

Some of these children have already married deaf husbands or wives, and deaf offspring have appeared in the third generation.

I can cite families in which the deafness has been handed down through four generations, and can give in minute detail particulars relating to a family in Maine in which congenital deaf-mutes have appeared for five successive generations in increasing numbers, and in which the younger deaf-mutes are marrying deaf-mutes.

My list of deaf children of deaf parents (all, excepting one, born before 1880) comprises 528 cases (mostly young), 91.6 of whom were deaf from birth.

Upon the assumption that 528 such cases were living when the Tenth Census was taken, we obtain the following results: 1. One person in every 1,480 of the general population was deaf-and-dumb, and one person in every 64 of the deaf-mute population was a child of deaf-mute parents; 2. One person in every 2,736 of the general population was deaf from birth, and one person in every 38 of the congenitally deaf population was a child of deaf-mute parents.

The laws of heredity indicate, that, if these deaf children should marry congenitally deaf husbands or wives, an increased proportion of deaf offspring will appear in the next generation; and that the continuous intermarriage of congenital deaf-mutes from generation to generation may ultimately result in the formation of a deaf variety of the human race in America, in which all or most of the children will be born deaf.

In these conclusions I am supported by the following American men of science, all members of the National Academy of Sciences, and most of these experts on the subject of heredity. These gentlemen are Professor Edward D. Cope, editor of the *American Naturalist*; Professor Alpheus Hyatt of Harvard University; Professor William H. Brewer of Yale University; Dr. Bowditch of Harvard University; Professor Simon Newcomb of Washington, D.C.; and Professor W. K. Brooks of Johns Hopkins University.

I would therefore urge upon the United States the importance of examining in the next census the marital relations of defective persons, and the extent to which their defects have been inherited by their offspring.

The enumeration of the defective classes is always found to be itself defective.

However perfect the classification may be, the returns of these classes will always be incomplete, on account of a natural objection to expose the defects of relatives, especially when these are very young.

Accuracy of enumeration will be promoted by eliminating from the census schedules (as far as may be possible) every question that could wound the feelings of parents or friends of afflicted persons. For example: if the enumerator approached the subject of defects by asking whether the persons enumerated were perfect in sight, hearing, mind, and body, he would be more likely to secure the information desired than if he asked a fond mother whether her child was "blind, deaf-and-dumb, idiotic, insane, maimed, crippled, bedridden, or otherwise disabled."

There are degrees in every defect, and the lesser forms are more

capable of amelioration than the graver. Classification under the graver forms tends to the exclusion of the lesser from the returns; but classification under the lesser forms would include the graver, and be less objectionable to friends, so that evasions would be fewer, and the returns more accurate and complete. For example: the blind, deaf-and-dumb, idiotic, insane, maimed, crippled, bed-ridden, and otherwise disabled, would all be returned under the head of defects in sight, hearing, mind, or body; but the converse would not necessarily be true.

The returns should include all persons laboring under disabilities of sight, hearing, mind, or body, of sufficient magnitude to prevent education in ordinary schools, lessen wealth-producing power, and incapacitate for military service.

The deaf and the blind should be grouped into a sub-class by themselves, and separated as much as possible from the other defective classes, because they are enumerated chiefly for educational purposes, whereas the others need eleemosynary care or restraint.

Public establishments for purely educational purposes should be classified as "schools," and not as "asylums." They should be included in statistics relating to the general education of the people, and excluded from those relating to charitable institutions.

Many children who cannot profitably attend ordinary public schools on account of disabilities are allowed to grow up without instruction, because parents object to send them to asylums, or institutions governed by State boards of charity.

The statistics of the Tenth Census show the following figures relating to defective children of school age (six years and under twenty-one):—

	Total in the United States.	Total in Special Schools.
Blind.....	7,768	1,534
Deaf-and-dumb.....	15,059	4,893
Idiotic.....	29,373	1,942
Insane.....	3,184	—

The term "deaf-and-dumb" is not only objectionable in itself, but is incorrect, because it classifies those who belong to this class as laboring under a double disability instead of a single one.

Deaf-mutes are simply persons who are deaf from childhood; and dumbness or muteness is the result of the natural defect, and not a defect in itself. The vocal organs are not defective.

Many of the so-called deaf-and-dumb can speak. Some had acquired the art before hearing was lost, and others acquired it by instruction in school.

In the census of 1880 all persons who lost hearing before they reached the age of sixteen years are classified as "deaf-and-dumb," whether they can speak or not.

This incorrect and very objectionable classification leads to evasion and inaccurate returns.

Dumbness by itself is not a defect calling for enumeration in the census (unless, indeed, for statistical purposes and the determination of causes), for defective speech alone is not a disability that prevents instruction in ordinary schools. It does not materially lessen wealth-producing power, nor does it incapacitate the person for military service.

Persons who have not studied the subject generally fail to realize that deaf-mutes should be classified among the deaf, and not among the dumb; and enumerators, therefore, can hardly be expected to follow the classification.

For the sake of accuracy in the returns, therefore, it would be well to make defective speech a subject of inquiry in the primary schedule relating to population. The dumb who are deaf, and the dumb who are idiotic, will appear on supplementary schedules relating to the deaf or the feeble-minded; and the dumb who are neither deficient in mind nor hearing need have no special schedule of inquiry.

Special schedules relating to all the defective classes (except the dumb) should be prepared with the assistance of experts of two kinds; viz., specialists who have studied the causes of the defects,

and teachers who are familiar with the special methods of instruction necessary.

The gravity of the disabilities resulting from deafness can be ascertained from two elements: (1) the age or period of life at which the defect occurred; and (2) the amount of deafness (whether total or partial). The former element is the more important of the two, for a slight defect of hearing in an infant results in graver disabilities than total deafness occurring in adult life. For example: in the case of the deaf infant, the defect interferes with the acquisition of language through the ear, and the child remains dumb. His thoughts are carried on without words, so that a mental condition exists which is abnormal. His ignorance is so great as to be appalling; for his mind is deprived of every thing that other people have ever heard of or read about that is not derived directly from their own observation. Without special instruction, such children grow to adult life with all the passions of men and women, but without the restraining influences that spring from a cultivated understanding.

Persons who become deaf in adult life have no greater disability than the defect itself; but, where deafness occurs in childhood, incidental disabilities arise which are greater than the natural defect; but because they are incidental, and not natural, they are capable of amelioration, and even complete removal, by suitable instruction in special schools. Hence the very great importance of a correct enumeration of the young deaf children.

In the primary schedule relating to population the defective classes should be grouped together under the head of "physical and mental condition," instead of under "health," as was done in 1880. The following form is suggested for incorporation in the primary schedule relating to population:—

PHYSICAL AND MENTAL CONDITION.							
Is the person [on the day of the enumerator's visit] sick or temporarily disabled, so as to be unable to attend to ordinary business or duties? If so, what is the sickness or disability?	CONDITION OF —						
	The Senses.		(of persons 5 or more years of age.	The Mind.		The Body.	
	Sight.	Hearing.		Mental Development.	Mental Health.	Bodily Condition.	Bodily Health.

The enumerator should be instructed to ask whether the person has perfectly normal sight, hearing, and speech; whether the mind is normally developed and in a healthy condition; and whether the bodily condition is normal and the general health good. If the answer is "yes," the enumerator should indicate the reply by a horizontal mark (—) placed in the proper column; if "no," by a mark sloping from right to left (/); and, if the question is not answered in a satisfactory and reliable manner, the column should be left blank. If the physical or mental condition is reported as "not perfectly normal" (/), the enumerator should then inquire whether the disability is sufficiently great to prevent instruction in an ordinary school, to interfere with the acquisition of a suitable means of livelihood, and to incapacitate for military service. If the answer is "yes," he should change the negative mark (/) into a cross (x), and proceed to put the interrogatories contained in the supplementary schedule relating to the special class of defect noted.

As the supplementary schedules should be prepared with the assistance of specialists, it may perhaps not be advisable for me at the present time to refer to the details, excepting so far as to say that inquiries should be instituted relating to the causes of defects and their inheritance by offspring. The marital relations of defective persons should be noted and the results tabulated. The total number of children born to them should be recorded, and the number who died young. The record should also note the number of defective and normal offspring.

In examining the ancestry of deaf-mutes, I have had occasion to consult the original population schedules of former censuses, which are preserved in the Department of the Interior; and I have found little difficulty in tracing the families backward from census to census in the male line of ascent. If the name of the father had been given in former censuses, it might now be possible for genealogical experts to trace from these records the American ancestry of every person now living in the United States in every branch, for the name of the father would give the maiden name of females. I therefore suggest that in the census of 1890 the father's name should be noted in that part of the schedule that relates to the nativity of the parents, so that the people of the United States may leave to their descendants genealogical records from which their full ancestry may at any future time be ascertained.

MENTAL SCIENCE.

Negative Suggestions.

THE meaning of this term as applied to certain hypnotic phenomena has become quite familiar. It refers to the ignoring by the subject of a portion of his sensory experience. If told that upon awakening a certain person will be absent from the room, such a person may stand directly before him, and he will be entirely ignorant of his presence. Dr. Bernheim, in studying the details of this phenomenon (*Revue de l'hypnotisme*, December, 1888), regards the condition as of purely psychic character. The defect is not physiological. The eye sees, for the subject will not run against the "invisible" person, but the brain ignores the impressions made upon it. It refuses them a hearing. This point, that in this condition the perceptions are really present but are not allowed admittance into consciousness, Dr. Bernheim proposes to demonstrate. He tells an apt subject in the hypnotic state that on her awakening he will be gone. She is awakened, searches about, but gives no sign of recognizing Dr. Bernheim. The latter speaks to her, shouts into her ear, sticks a pin into her skin, even touches her eye with it, but all with no response. She is oblivious to all impressions coming from him. If some one else touches her with a pin, she withdraws her hand at once. To do this, she must distinguish Dr. Bernheim from the other spectators; and this involves sight.

It should be noted that this experiment will not always have the same result. If told that they will not see Dr. Bernheim, some subjects will not see him, but will hear him and feel his touch, — a condition causing them a good deal of surprise, and often leading them to infer that another person must be speaking to them, and so on. By suggesting in detail that the doctor will neither be seen, heard, nor felt, a complete anæsthesia can be established.

Returning to the former subject, Dr. Bernheim, while invisible, spoke abusive words to her; but her face betrayed no emotion. Thereupon she was hypnotized by an assistant, and given the suggestion that upon her re-awakening the doctor would again be present. Dr. Bernheim then asked what he had said to her. She denied his having been present; but he insisted, impressing upon her that she would remember all. She declares it must have been a dream, but at last with great hesitation repeats Dr. Bernheim's words, his sticking her with a pin, and so on. The latent impression can thus be revived, showing that it was physiologically recorded. It is not remembered, but by a new suggestion or great effort can be revived.

A similar experience often happens in the normal state. We are absorbed in work while conversation goes on about us. We hear nothing at the time, and we have no idea of what has been said. Later, a chance association, or what not, shows that we had really been taking in what was said, though absorbed by our own work. The proof of this power of revivification is important as an aid to the explanation of hypnotic states, and is equally valuable in the medico-legal complications that might arise from them.

FATIGUE OF SIGHT. — Experiments have recently been made showing in what order a fatigued eye recovers the power of perceiving different colors. The important factor is what color has been used to induce fatigue. If the eye has been fatigued by long exposure to red, the sensitiveness for green is the first to re-appear, then for blue, then yellow, and finally red. After a "blue-fatigue,"

the order is yellow, red, green, blue; after a "green-fatigue," the order of recovery is red, blue, yellow, green; after "yellow-fatigue," it is red, blue, green, yellow. The eye recovers last the perception of the color by which the fatigue has been induced, and first recovers the sensitiveness for the complementary color. The fatigue is in the retina, for it is an independent phenomenon in the two eyes. The point of finest vision, the fovea, requires a longer time to recover from color-fatigue than the less sensitive lateral portions of the retina. The physiological process is considered to be related to the visual purple of the rods and cones.

SENSE OF TASTE. — In the case of a patient whose entire tongue, including the large circumvallate taste-papillæ at the root of the tongue, had been removed, it was found that some power of taste remained. The sensations of sweet, bitter, and sour could be obtained by applying appropriate substances to the back of the pharynx or the stump of the tongue, though if applied to the tongue the taste was apparent only during swallowing. The taste of salt was not perceived. Though these results are not fully in harmony with previous experiments, they are helpful in localizing the tasting-powers of various portions of the mouth cavity.

ACROPHOBIA. — Among the many curious psychical experiences that are now attracting attention, the one to which the term "acrophobia" has been applied has many points of interest. It refers to an exaggerated condition of the fear when in high places. Dr. Verga has recently described the phenomena in his own case. Though by nature not at all timid, all his courage leaves him when above ground. He has palpitations in mounting a step-ladder; finds it extremely unpleasant to ride on top of a coach, or even to look out of a first-story window. His idiosyncrasy forbids him to use an elevator, and the mere thought of those who have cast themselves down from high places causes tingling all over his person. The thought of the earth spinning through space is enough to cause discomfort. He finds this fear growing upon him as sight and hearing become less acute, and what walking in high places was formerly possible for him is getting more and more difficult. A greater or less degree of this fear is undoubtedly quite common. A very intense form of it seems perfectly consistent with normal mental functions.

COLOR-BLINDNESS. — Examinations in English schools tend to bear out the opinion that color-blindness is often declared to be present, when really no organic defect, but only a poor training in the naming and distinction of colors, is apparent. Some pupils, who at first seemed unable to tell colors, could be taught to do so in a few hours. One boy always called black white, and white black, and regarded colors in general as of little importance. Of one hundred boys examined, not one could be declared color-blind; of two hundred boys who were set to arranging and matching shades, none found any difficulty after a few hours' practice; and all could distinguish ordinary colors.

NOTES AND NEWS.

PROFESSOR SHALER of Harvard has just published in the "Memoirs of the Museum of Comparative Zoölogy," by permission of the director of the Geological Survey, a report on the Cambrian district of Bristol County, Mass., including a discussion of twenty-three species of fossils in the lower Cambrian section, from localities previously unknown to science. The total section of Cambrian beds exposed has a thickness of about seven thousand feet, and below that section there is a pre-Cambrian series of unknown depth, but probably approaching ten thousand feet. The report includes a geological map of the district, and two plates of fossils.

— **Frederick Schwatka**, the noted Arctic traveller, who made the longest sledge-journey on record in search of Sir John Franklin's remains, is about to head an expedition through the hitherto unknown northern mountains of Mexico.

— **Surgeon-Gen. Hamilton** has gone to Chicago on official business, and will be absent from Washington for a month. He reports progress in his efforts to reduce Florida cities to a safe sanitary condition.

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SCIENCE RECORDS WITH REGRET the death by consumption of Mr. Z. L. White, who for some months has served as its Washington correspondent. It occurred in Nassau, N.P., to which balmy island Mr. White fled a month ago for his health. He was one of the best-equipped and best-known of Washington correspondents. For years he had charge of the *Tribune* bureau, and later represented the interests of the *Philadelphia Press*. He became much talked about in connection with the publishing of the treaty of Washington before it was officially given out, and was imprisoned by the Senate for refusing to betray the gentleman from whom he obtained it. In addition to the meed of praise which the press of the country will accord to Mr. White for unusual enterprise and intelligent industry, we gladly bear witness that he was a careful observer and an accurate compiler of scientific news. E. J. Gibson, the *Philadelphia* representative of the *Press* in Washington, said to our correspondent, "I first became acquainted with Mr. White while he was the Washington correspondent of the *Tribune*, eleven years ago. I was then employed in the editorial rooms of the paper in New York, and during the time Mr. White remained connected with it I had opportunity to become well acquainted with him, and

always found him a most agreeable associate and a man of the highest honor. He worked his way up in the *Tribune* office in a comparatively short time, promotion coming as a result of his energy and ability, and in that respect he was often referred to in the office as an example for new-comers. His acquaintance with public men gave him a great advantage in the collection of news, and at a convention he was able to get at the bottom facts in a very short time. His newspaper work was so well known, both on the *Tribune* and the *Philadelphia Press*, that there is no need to speak of it. He was a studious, unassuming man, and a gentleman in every sense of the word. Few newspaper men had the confidence of so many public men, and he was never accused of betraying a confidence. His kindly manner made him friends wherever he went, and he was always cheerful and hopeful."

WE HAVE FREQUENTLY had occasion to comment upon the condition of the New York City schools during the past year. This condition, and the influences that are at work in them, have far more than local interest. At the organization of the Board of Education for 1889, which took place last week, the controlling influence of the political machines was again made manifest, and those who had hoped for some improvement in this respect were bitterly disappointed. Two members of the board, who had expressed themselves publicly as in favor of a change, deserted their colleagues at the critical moment. The most contemptible and discreditable political methods had been used to bring this result about, and it again places in the president's chair the man whose previous course we so thoroughly disapproved of in our comments at the time of the contest of last spring. It is a serious matter, also, that the great city newspapers either keep their readers in ignorance of what is going on, or else endeavor to have them sympathize with it. It is the simple fact that the New York City schools to-day are in the hands of the political spoilsman, and they use them to provide places for themselves and their friends, and to perpetuate abuses from which they derive personal benefit. From the president of the Board of Education and the superintendent of schools, down to the very janitors, there is a mass of intrigue and chicanery which is a disgrace not only to the city of New York, but to the country.

AFRICA, ITS PAST AND FUTURE.¹

AFRICA, the oldest of the continents, containing the earliest remains of man, and the birthplace of European civilization, is the last to be explored. Long before the temples of India or the palaces of Nineveh were built, before the hanging garden of Babylon was planted, the pyramids of Cheops and Cephren had been constructed, the temples of Palmyra and Thebes filled with worshippers.

Greece owes its civilization to Egypt: its beautiful orders of architecture came from the land of the Nile. The civilization of Egypt had grown old, and was in its decay, when Rome was born. Think what a vast abyss of time separates us from the days of Romulus and Remus! And yet the pyramids of Egypt were then older by a thousand years than all the centuries that have passed since then.

For ages upon ages, Africa has refused to reveal its secrets to civilized man, and, though explorers have penetrated it from every side, it remains to-day the dark continent. This isolation of Africa is due to its position and formation. It is a vast, ill-formed triangle, with few good harbors, without navigable rivers for ocean-vessels, lying mainly in the torrid zone. A fringe of low scorched land, reeking with malaria, extends in unbroken monotony all along the coast, threatening death to the adventurous explorer. We wonder that we know so much, rather than so little, of Africa. Our ignorance of Africa is not in consequence of its situation under the equa-

¹ Annual address of Hon. Gardiner G. Hubbard, president of the National Geographic Society, at its meeting, December, 1888.

tor, for South America in the torrid zone has long been known. There the explorer easily penetrates its recesses on its great rivers, — the Orinoco, Amazon, and La Plata, — for they are navigable from the ocean far into the interior. The Amazon, 3,000 miles from its mouth, is only 210 feet above the ocean-level, and, with its branches, is navigable for 10,000 miles. Africa also has three great rivers, — one on each side of this peninsula. On the north, the Nile, the river of the past, empties into the Mediterranean Sea, but its navigation is soon interrupted by five cataracts; so that the camel, the ship of the desert, bears the wares of Europe from the foot of the first cataract far up the river, 800 miles, to Berber, whence they are again shipped by boat 2,000 miles to Gondokoro, close to the lakes Albert and Victoria Nyanza, 4,000 feet above the sea-level, 4,200 miles by water from the Mediterranean.

On the west, the Kongo, the river of the future, empties into the Atlantic Ocean under the equatorial sun; but its navigation is also impeded by successive falls extending from its mouth to Stanley Pool. Then there is almost uninterrupted navigation on the river and its tributaries for 10,000 miles. Far inland the head waters of its north-eastern branches interlace with the waters of the Nile. Another branch rises in Lake Tanganyika in eastern Africa, while the main river finds its source higher up in the mountains, north of Lake Nyassa, 5,000 feet above the sea-level. On the east the Zambezi, the great river of southern Africa, empties into the Indian Ocean opposite Madagascar. The navigation of its main branch, the Shire, is interrupted not far from the ocean. The Zambezi itself is navigable to the rapids near Tete, 260 miles from its mouth; while one or two hundred miles higher up are the mighty falls of Victoria, only exceeded in volume of water by the Niagara, and nearly equal in height.

In whatever direction Europeans attempted to penetrate Africa, they were met by insurmountable obstacles. Communication by water was prevented by falls near the mouths of great rivers. The greater part of the coast was most unhealthy, and, where not unhealthy, a desert was behind it; but these obstacles, which formerly prevented exploration, now stimulate the traveller to explore the dark continent. The modern explorations of Africa commenced one hundred years ago, when Mungo Park crossed the Desert of Sahara, and lost his life in descending the Niger. From that time to the present, travellers in ever-increasing numbers, entering Africa from every side, have undertaken its exploration. Some who have entered from the Atlantic or Pacific coasts have been lost in its wilds, and nothing heard of them for one, two, or three years, when they have emerged on the opposite coast; others have passed from the coast, and have never been heard from, stricken down by disease, or killed by the natives. Zanzibar has been a favorite starting-point for the lake region of Central Africa. Stanley started from Zanzibar on his search for Livingstone with two white men, but returned alone. Cameron set out by the same path with two companions, but, upon reaching the lake region, he was alone. Keith Johnson, two or three years ago, started with two Europeans: within a couple of months he was gone. Probably every second man, stricken down by fever or accident, has left his bones to bleach along the road. Drummond, a recent explorer of Africa, chose a route by the Zambezi and Shire Rivers as healthier and more desirable. Let us hear his experience. Early in his journey, at the missionary station of Livingstonia, on Lake Nyanza, he entered a missionary home: it was spotlessly clean; English furniture in the room, books lying about, dishes in the cupboards; but no missionary. He went to the next house: it was the school; the benches and books were there, but neither scholars nor teacher. Next, to the blacksmith shop: there were the tools and anvil, but no blacksmith. And so on to the next and the next, all in perfect order, but all empty. A little way off, among the mimosa groves, under a huge granite mountain, were graves: there were the missionaries.

The Niger is the only river in all Africa navigable any considerable distance above its mouth, by small steamers adapted to its navigation; but the Niger does not give access to the interior, as it rises within 100 miles of the ocean, and, after making a great bend around the mountains of the Guinea coast, empties into the ocean only about five degrees south of its source, after a course of 2,500 miles. Its main branch, the Benue (or "Mother of Waters"), is navigable 500 or 600 miles above its junction with the Niger. The

country through which it flows is thickly peopled and well cultivated; but the natives are fierce and warlike, and have until recently prevented any exploration of the Benue.

The Mountains of Africa.

As mountain-ranges determine the course of rivers, influence the rainfall, and temper the climate, we must understand the mountain system of Africa before we can understand the continent as a whole.

From the Red Sea to the Cape of Good Hope, successive ranges of mountains follow the coast, sometimes near, at others two or three hundred miles inland; the land, in the latter case, rapidly ascending from the coast. The only breaks in this long chain are where the Zambezi and Limpopo force their way to the Indian Ocean. High peaks are found all along these ranges.

In Abyssinia, on the Red Sea, there is a range of snow mountains 14,700 feet in height. A few hundred miles to the south-east, and near Lake Victoria Nyanza, is Kilima Ndjaro, 18,700 feet high, — the highest mountain in Africa, — and the mountains of Massai-Land, a continuation of the Abyssinian Mountains. Another range, apparently an offshoot of the long range from the Red Sea, forms a wall 100 miles long, and 10,000 feet high, on the east of Lake Nyassa, separating the waters of the lake from the Indian Ocean. This range continues to the Zambezi. South of this river the mountains rise 8,000 to 10,000 feet in height. In Cape Colony are several ranges of mountains. The highest peak is Compas Berg, 8,500 feet. West of these ranges, in the equatorial region, is an elevated plateau in which is the lake region, then other ranges, and a gradual descent towards the Atlantic. There are no continuous ranges of mountains on the western coast; but at Kamerun there is a cluster of mountains reaching an elevation of 13,100 feet; and south of Morocco some of the peaks of the Atlas Mountains reach an elevation of 12,000 to 13,000 feet, but they have little if any influence on the rainfall or temperature of the country. It will be seen from this statement that in eastern Africa are high mountain-ranges and an elevated plateau; that the land in equatorial Africa gradually descends toward the west and north-west until within one or two hundred miles of the Atlantic Ocean, when the descent is rapid to the low and unhealthy coast-lands. North of Cape Colony, in the territory claimed by Portugal, the general elevation of the interior is 3,000 feet or over, sloping towards the valley of the Kongo near the equator, then north of the Kongo rising to an elevation of about 2,000 feet, and descending to 1,200 feet at Lake Chad.

Careful computations have been made to ascertain the average elevation of the continent. The mean of the most careful estimates is a little over 2,000 feet. The interior is therefore elevated above the miasmatic influences of the coast, but exactly what effect this elevation has upon the temperature can only be ascertained after careful investigation and a series of observations. North of Guinea and Senegambia the coast is less unhealthy; but, as the Desert of Sahara extends to the ocean, the country is of little value, and is therefore left to the native tribes, unclaimed by Europeans.

In the International Scientific Series it is stated that there are in Africa about ten active volcanoes, — four on the west coast, and six on the east, — but I have not found any corroboration of this report, and think it very doubtful if there are any volcanoes now in operation. The Kilima Ndjaro and Kamerun were formerly active volcanoes, for the craters still exist. In the south the diamond-fields are of volcanic ash formation.

The lake region of Africa stretches from the waters of the Nile three degrees southward, to the waters of the Zambezi, fifteen degrees south, — a lake region unequalled, in extent and volume of water, except by our lakes. Here is the Victoria Nyanza, the queen of inland seas, 4,000 feet above the sea-level; and a long series of lakes, great and small, at equal elevation. The more striking are Bangweolo to the south-west, the grave of Livingstone, and Nyassa on the south-east. In their depths the Nile, the Kongo River, and the Shire (the main branch of the Zambezi) have their source.

The great belt of equatorial Africa, situated between the 15th parallel of north latitude and the 15th parallel of south latitude, has continuous rains, is everywhere well watered, and has a rich and fertile soil. Some portions are thickly populated, and

it is capable of sustaining a dense population. North and south of this belt there are two other belts of nearly equal width. In each of these belts there are wet and dry seasons, with abundant rain for the crops. The heaviest rainfall in the north belt is in June, while in the south belt it is in December. The rainfall gradually grows less toward the north, and also toward the south, until it ceases in the Desert of Sahara on the north, and the Desert of Kalahari on the south. On the edge of each of these deserts are Lake Chad on the north, and Lake Ngami on the south. North of the Desert of Sahara, and south of the Desert of Kalahari, there is an abundant rainfall, a healthy climate, and fertile soil. Morocco, Algiers, Tripoli, and Egypt, on the Mediterranean, are in the north region; and Zulu-Land, the Orange Free State, and Cape Colony, in the corresponding region of the south.

That portion of Africa north of the equator is three or four times greater than that south, and the Sahara Desert and Lake Chad are several times greater than the Kalahari Desert and Lake Ngami. The Sahara Desert, the waterless ocean three times as large as the Mediterranean, extends from the Atlantic Ocean to the Red Sea, broken only by the narrow valley of the Nile. It is interspersed with oases, and with the valleys of many dry streams, with some mountains 8,000 feet. It has the hottest climate in the world. Travellers tell us, that, in upper Egypt and Nubia, eggs may be baked in the hot sands; that the soil is like fire, and the wind like a flame; that in other parts of the desert the sand on the rocks is sometimes heated to 200° in the day-time, while in the following night the thermometer falls below freezing-point. In crossing the desert the traveller will hardly need a guide, for the road is too clearly marked by the bones and skeletons that point the way.

Lake Chad receives the drainage of a considerable area of country. In the dry season it has no outlet, and is then about the size of Lake Erie. In the wet season it is said to be five times as large. Its level rises by twenty or thirty feet until it overflows into the Desert of Sahara, forming a stream which runs northward for several hundred miles, and is finally lost in a great depressed plain. In the southern part of Africa the level of Lake Ngami rises and falls in a similar manner.

Through the great equatorial belt runs the Kongo, one of the wonderful rivers of the world. The more we know of this river and its tributaries, the more we are impressed by its greatness and importance. Its principal source is in the mountain-range which separates Lake Nyassa from Lake Tanganyika, between 300 and 400 miles west of the Indian Ocean; thence it runs southerly through Lake Bangweolo. On leaving this lake, it takes a north-west course, running from 12° south latitude to 2° north latitude, thence running south-westerly to the ocean, nearly 3,000 miles. The river Sankuru, its principal tributary, empties into the Kongo some distance above Stanley Pool on the south. The mouths of the Sankuru were discovered by Stanley, who was struck by the size and beauty of the river, and by the lakes which connect it by a second outlet with the Kongo; but he little realized the magnitude of the river. Even before the journey of Stanley, Portuguese explorers had crossed several large streams far to the south of the Kongo, — the Kuango, the Kassai, and the Lomami, — and explored them for several hundred miles, but were unable to follow them to their mouths. In 1885 and 1886, Wissmann and the Belgian explorers sailed up the Sankuru to the streams discovered by the Portuguese. The next largest branch is the Obangi, now called the Obangi-Welle, which flows into the Kongo, on the westerly side of the continent, a little south of the equator. An expedition organized by the Kongo Free State steamed up this river in the winter of 1887 and 1888, and solved the problem, so long discussed, of the outlet of the Welle. The expedition left the Kongo in the steamer "En Avant," Oct. 26, 1887. It passed several rapids, and steamed to 21° 55' east longitude, when it was stopped by the "En Avant" running on a rock, and the opposition of hostile natives. Here it was only 66 miles from the westernmost point on the Welle reached by Junker, and in the same latitude, each stream running in the same direction, leaving no room to doubt that the two waters unite.

The Little Kibali, which rises a little to the west of Wadelai in the mountains of Sudan, is the initial branch of this river, which bears successively the name of "Kibali," "Welle," and "Doru,"

and empties into the Kongo under the name of "Obangi," after a course of 1,500 miles.

Appropriation of Africa by Europe.

The English, French, Germans, and Belgians have within a few years planted colonies in Africa. They believe it is more for their interest to colonize Africa than to permit their surplus population to emigrate to America. In Africa the colonies must depend upon the home country, and open new fields for manufactures and commerce. These countries realize the necessity of creating new markets, if they are to continue to advance. They know that in equatorial Africa there are more than 100,000,000 people wanting every thing, even clothes.

The whole coast of Africa on the Mediterranean Sea, the Atlantic and Indian Oceans from the Red Sea to the Isthmus of Suez, is claimed by European nations, with the exception of two or three small inhospitable and barren strips of coast. England occupies Egypt, and will hold it for an indefinite period. France has its colonies in Tripoli, Algiers, and Morocco, and on the Atlantic coast its factories in Senegambia. It seeks a route from Algiers across the desert to Lake Chad, and from Senegambia up the Senegal by steamer, thence across the country by rail to the head of navigation on the Niger, and down that river to Timbuctu.

England occupies Sierra Leone, the Gold and Slave Coasts, the delta and the valley of the Niger, and its branch the Benue. It has factories on these rivers, and small steamers plying on them, and seeks Timbuctu by the river Niger. It controls almost the entire region where the palm-oil is produced.

Timbuctu, long before Africa was known to Europe, was the centre of a large trade in European and Asiatic goods. Caravans for many hundred years have crossed the Desert of Sahara from Timbuctu north to the Mediterranean, and east to Gondokoro, carrying out slaves, gold, and ivory, and bringing back European and Asiatic goods. Sandwiched between the English possessions, Liberia struggles for existence, its inhabitants fast degenerating into barbarism.

Joining the English possessions on the Gold Coast, two degrees north of the equator, are the German possessions of Kamerun, with its high mountains and invigorating breezes; but the land at the foot is no more favorable to the European than the Guinea coast. One or two hundred miles in the interior of this part of the continent, the land rapidly rises to the tableland of equatorial Africa, rich and fertile, resembling the valley of the Kongo, possibly habitable by Europeans.

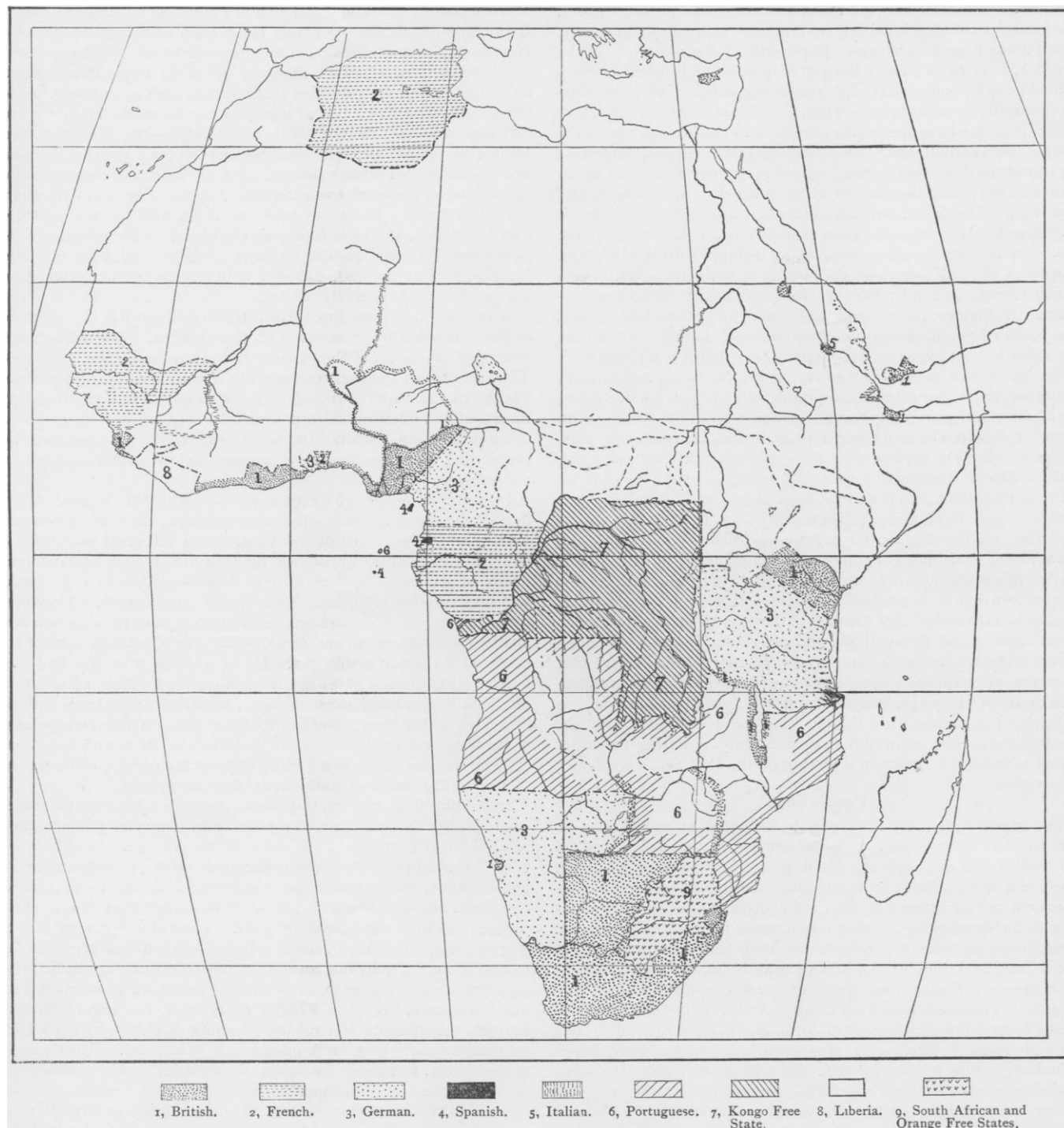
Next the French occupy the Ogowe, its branches, and the coast, and claim the country inland to the possessions of the Kongo Free State. Under M. Brazza, they have thoroughly explored the country to the river Kongo, and have established factories at Franceville and other places.

The Kongo Free State comes next. It holds on the coast only the mouth of the river, its main possessions lying in the interior. Belgium is the only country that has planted colonies inland. Like all the interior of equatorial Africa, the valley of the Kongo is well watered, has continuous rains. The land is rich and fertile, but it is practically inaccessible, and before any colonies can flourish, or any extensive commerce can be carried on, must be connected by railroad with the ocean. The Compagnie du Congo has just completed a survey for a railroad on the south side of the Kongo, from Matadi, opposite Vivi, to Stanley Pool. It did not encounter any unusual difficulties, and has submitted the plans and projects to the King of Belgium for his approval.

South of the Kongo Free State are the Portuguese possessions of Angola, Benguela, and Mossamedes. Portugal, the first country to circumnavigate Africa, and the first to colonize it, has for several centuries had factories, and carried on a large trade with Africa, exchanging clothes and blankets for slaves, gold, and ivory. The Portuguese claimed the valley of the Kongo; but their claim has been reduced, and is now bounded for a considerable distance on the north by a line running due east, and west on the 6th parallel of south latitude. They have good harbors at Loango Po, Benguela, and Mossamedes, on the Atlantic coast, and the best harbor of Africa at Delagoa Bay on the Indian Ocean. The territory they claim will, I believe, prove to be the most valuable in Africa. It is well

watered by numerous tributaries of the Kongo, and by the Zambezi and its branches. It is higher than the Kongo valley, and is therefore more healthy. Several Portuguese, English, and German travellers have crossed and recrossed this part of the continent, and the Portuguese have some small settlements on the coast and in the interior. The Portuguese of the present generation have not the

The only harbor on the coast is now held by the English; and, from the character of the country, we are not surprised that the Germans have abandoned it, for we are told that "the coast is sandy and waterless, deficient in good harbors, and devoid of permanent rivers, washed by never-ceasing surf, bristling with reefs, and overhung by a perpetual haze."



APPROPRIATION OF AFRICA BY EUROPEANS.

enterprise and trading spirit of their forefathers, and are doing very little for the settlement of the country.

South of the Portuguese possessions, England claims from the Portuguese possessions on the Atlantic to their possessions on the Pacific, including Namaqua-Land, Cape Colony, the Transvaal, and Zulu-Land. Namaqua and Damara Land, formerly claimed by the Germans, are now put down on some of the maps as claimed by them; but, excepting a small colony at Angra Pequena, it is now, I believe, all claimed by the English.

North of Zulu-Land, the Portuguese claim the coast of Zanzibar. Over Zanzibar, Germany has lately assumed the protectorate, under a treaty with the Sultan of the country, claiming the land from the ocean to the great lakes; then England again, a little to the north of Zanzibar, the rival of Germany in its claims. The English have factories north-west of Zanzibar, and a regular route up the Zambezi and Shire Rivers, with a single portage to Lake Nyassa, and a road to Lake Tanganyika. They have steamers on each of the lakes, and several missionary and trading stations. The latest news from

this part of Africa says the route to the lakes has been closed, and the missionaries and merchants murdered.

North of the English possessions, the coast to the Red Sea is barren and inhospitable, little rain and no harbors, and so worthless that it has not been claimed by any European nation. North of this region is Abyssinia on the Indian Ocean and Red Sea, — a mountainous country with deep valleys, rich and fertile, but most unhealthy. Three or four thousand feet above the level of the sea, is a healthier country, inhabited by a race of rugged mountaineers, whom it has been impossible to dispossess of their lands. On the Red Sea, Italy has a small colony at Massaua, and England a camp at Suakin. The only parts of the coast not claimed by Europeans are inhospitable, without population or cultivation of any kind.

The Belgians have spent many millions in the exploration of the Kongo and its tributaries. They have several small steamers making trips from Leopoldville up the river to Stanley Falls, and up its branches, supplying the main stations on the river and its branches. The Kongo Free State, unlike all other African colonies, is free to all. Merchants of any nation can establish factories, carry on trade, and enjoy the same privileges and equal facilities with the Belgians. The valley of the Kongo, and the plateau of the great lakes, have a similar climate and soil; but the Kongo is easier of access, provisions are cheaper, more readily obtained, the natives less warlike. The Kongo Free State will therefore be more rapidly settled than any other part of the equatorial regions excepting Cape Colony.

The trade with these countries is carried on by European companies under royal charter, with quasi-sovereign powers for ruling the country and governing the natives, as well as for trading with them. England, Germany, and Portugal subsidize steamship companies which make regular trips along the western coast, stopping at the different stations.

From this statement it will be seen that England occupies the healthiest portion of Africa (Cape Colony), the most fertile valleys (the Nile and the Niger), the richest gold-fields (Gold Coast and Transvaal); that Portugal comes next, claiming the most desirable portion of equatorial Africa north of Cape Colony and south of the Kongo, but that it is unable to colonize this country, which will inevitably fall under the control of England; that the French claim Algiers and Senegambia, and are contending with England for the trade of Timbuctu and the upper valley of the Niger; that Germany, after vain attempts to penetrate the interior from Kamerun or Angra Pequena, has planted her flag at Zanzibar, and has determined to contest with England for the lake region and the great plateaus of Central Africa; while Italy, imitating the other states, tries in vain to obtain a footing on the Red Sea, worthless if obtained.

Population.

The population of Africa is roughly estimated at 200,000,000, — about 18 to a square mile, as against 88 in Europe. It is supposed that Africa was originally inhabited by the Hottentots, or Bushmen, who are now found only in south-western Africa, and by the pygmies or dwarfs scattered about Central Africa, who, some say, belong to the same group. This group is noted for its dwarfed stature, generally under five feet; but whether their size is natural, or due to privation and scanty food, is not certainly known. The Hottentot language is distinct from any other known form of speech. They seem to have been driven from Central Africa by the Bantu. The Bantu occupy the greater part of Africa south of the equator. They probably formerly inhabited north-eastern Africa, but were driven from their homes by the Hamites. The Bantu resemble the Negro in their general character, color, and physique, but their language shows essential differences. There are countless tribes of Bantu, each tribe having its own language, yet there was originally a primeval Bantu mother-tongue, from which all the dialects of this immense region are undoubtedly derived. The idioms of this family are generally known as the alliteral class of languages. North of the Bantu are the Negroes proper, occupying the greater part of Africa between 5° and 15° north latitude. The negro tribes are multitudinous, and, though alike in their main physical features, are diverse in their speech.

North of the Negro are the Nuba Fulah group, apparently indigenous to Africa, but without any thing in common with the other indigenous groups. Their name, "Pullo," or "Fulah," means "yel-

low," and their color serves to distinguish them from the Negro. The Hottentot, Bantu, Negro, and Fulah, though distinct, have each of them the agglutinative forms of speech. The Hamites are found along the valley of the Nile and in Abyssinia. The Shemitic tribes occupy the larger part of the Sudan, bounded on the east by the Nile, and on the north by the Mediterranean and northern Atlantic coast.

About one-half of the population are Negroes proper, one-fourth Bantu, one-fourth Shemites and Hamites, a few Nuba Fulahs and Hottentots. There are almost innumerable tribes, speaking different languages or different dialects. Over six hundred tribes and languages have been classified by Shilo, yet each is generally unintelligible to the other. Practically speaking, there are but two great divisions among the inhabitants of Africa, — the Negroes and Bantu, occupying equatorial and southern Africa; and the Hamites and Shemites of northern Africa. But there is no clear-cut line even between the Mohammedan and Negro. For many hundred years the Negroes have been taken as slaves, and carried into the north of Africa, and have furnished the harems with wives, and the families with servants. The servants are often adopted into the families, so that the Negro blood now largely predominates even among the Shemites and Hamites.

A broader and more practical distinction than that of language or blood is made by the religion of the African. The Mohammedan religion was probably brought from Arabia by the Shemites. They conquered the country along the coasts, and exterminated or pushed to the south the former inhabitants. Then, more slowly but steadily, Mohammedanism forced its way south by the sword or by proselyting. Within the last fifty years it has re-assumed its proselyting character, and is now more rapidly extending than at any previous time.

Its missionaries are of a race nearly allied to the Negro. They live among them, adopting their customs, and often intermarrying with them. They teach of one God, whom all must worship and obey, and of a future life whose rewards the Negro can comprehend. They forbid the sacrifice of human victims to appease the wrath of an offended deity. They forbid drunkenness. They give freedom to the slave who becomes a Moslem, and thus elevate and civilize those among whom they dwell. The Christian missionary is of a race too far above him. He is a white man, his lord and master. He teaches of things his mind cannot reach, of a future of which he can form no conception; he brings a faith too spiritual; he labors with earnestness and devotion, even to the laying-down of his life. Yet the fact remains that Christianity has produced but little impression in civilizing and elevating the people, while the influence of Mohammedanism is spread on every side.

In passing from the equator south, the tribes become more degraded. Sir Henry Maine enunciated the theory of the evolution of civilization from the lowest state of the savage. In Africa he could have found all stages of civilization; in the lowest scale, man and his mate, living entirely on the fruits of the earth, in a nude condition, his only house pieces of bark hung from the trees to protect him from the prevailing wind. The vulture guides him to where, the previous night, the lion had fallen on his prey, leaving to him the great marrow-bones of the elephant or the giraffe; his only arms a stick, belonging to no tribe, with no connection with his fellow-man, his hand against every man, the family relation scarcely recognized. His mental condition is shown by his inability to count more than two: all above that is many. It is the land of the gorilla, and there seems to be little difference between the man and the ape, and, like wild beasts, they are hunted, and shot by the Boers. In ascending the scale, the family and tribal relation appears, — a house built of cane and grass or the bark of the tree; a few flocks; skill in setting traps for game; the weapon a round stone, bored through, and a pointed stick fastened in the hole. Then come tribes of a low kind of civilization, that cultivate a little ground, having a despotic king, who has wives without limit, numbering in some cases, it is said, 3,000; wives and slaves slaughtered at his death, to keep him company and serve him in another life. With them, cannibalism is common, and of these it is said that "when the sun goes down, all Africa dances." Then come tribes of a higher civilization, where the power of the chief is limited; where iron, copper, and gold are manufactured, and trade

is carried on with foreigners; where fire-arms have been substituted for the bow and spear. Next comes the Mohammedan, and last of all, on the shores of the Mediterranean, the civilization of the French and English.

It is a curious fact that many tribes that had made considerable advance in manufacturing iron and copper, have for some time ceased manufacturing; and that some have retrograded, and have lost some of the arts they formerly possessed. This decline apparently took place after the Mohammedans had conquered North Africa, and sent their traders among the Negro tribes, who sold the few articles the Negro needed cheaper than they could manufacture them, and therefore gave up their own manufactures. Such was the effect of free trade on interior Africa. The Mohammedans also manufacture less than formerly, depending more and more upon European manufactures. The enterprise of the white races defies native competition, and stifles attempts at native manufactures: there is therefore in all Africa a great falling-off in the progress of outward culture, and the last traces of home industries are rapidly disappearing.

Slave-Trade.

One of the departments of this society is the geography of life. At the head of all life stands man: it is therefore within our province to investigate those questions which more intimately concern and influence his welfare.

Slavery and the slave-trade have, within the last two hundred years, affected African life more than all other influences combined; and this trade, with all its sinister effects, instead of diminishing, is ever increasing. It has had a marked effect not only on the personal and tribal characters of the inhabitants, but on their social organization, and on the whole industrial and economic life of the country. It has not only utterly destroyed many tribes, but it has made the condition of all the other tribes one of restless anarchy and insecurity. It has been the great curse of Africa, and for its existence the Christian nations of Europe have been and are largely responsible. The temper and disposition of the Negro make him a most useful slave. He can endure continuous hard labor, live on little, has a cheerful disposition, and rarely rises against his master.

There are two kinds of slavery, — home and foreign. The first has always prevailed in Africa. Prisoners taken in war are either sacrificed, eaten, or made slaves. Slavery is also a punishment for certain offences, while in some tribes men frequently sell themselves, or by some act become slaves. These slaves are of the same race and civilization as their masters. They are usually well treated, regarded as members of the family, to whom a son or daughter may be given in marriage, the master often preferring to keep his daughter in the family to marrying her to a stranger. This slavery is a national institution of native growth. It is said one half of the inhabitants are slaves to the other half. The horrors of the slave-trade are unknown in this kind of slavery.

In the other case the slave is torn from his home, carried to people, countries, and climates with which he is unfamiliar, and to scenes and civilization which are uncongenial, where he is the slave of a master of a different color and of another and higher civilization, where the master and slave have nothing in common. The Spaniards made slaves of the Indians of America, but they were incapable of work, unfitted for slavery, and rapidly faded away. In pity for the Indians, the Africans were brought to supply their places. Their ability to labor was proved, and they were soon in great demand.

The slave-trade, as a regular commercial business, is said to have originated from a patent of Charles V. to one of his favorites, granting the exclusive right to transport 4,000 Negroes annually to the Spanish possessions in America. The patent was sold to some Genoese merchants for 25,000 ducats. The business was profitable; and respectable companies were formed in other countries to carry on a trade, protected and sometimes subsidized by the government.

In 1619 a Dutch company sent a cargo of slaves to Jamestown, Va., and thus slavery commenced in the United States. The Parliament of Great Britain incorporated the African Company of England; and by the Treaty of Utrecht, A.D. 1715, a contract for

supplying the Spanish colonies with slaves was transferred to Great Britain, and sold to the English African Company, which held the monopoly for over thirty years.

The Portuguese Company of Guinea, in 1701, contracted to furnish 10,000 "tonnes" of Negroes a year for the Spanish Main. The higher the civilization, the more cruel the master; and in no country does the slave seem to have fared worse than in Jamaica, for while the slave-trade lasted the slaves were worked to death. In one hundred years prior to 1807, when the slave-trade was abolished, 270,000 female, and 330,000 male slaves, or 600,000 in all, were imported into Jamaica. If the slave population had increased as the Negroes have increased in Jamaica since the Emancipation, the number in 1807 should have exceeded 1,000,000: it was in reality only 320,000. Although the slave-trade was abolished, it was still carried on clandestinely. When slavery was abolished in 1837, the Negro population was 300,000: in 1881 it was 600,000. Since the abolition of slavery, work has almost entirely ceased; and Jamaica, from being one of the wealthiest of islands, has become one of the poorest. But the Negro population, instead of decreasing as in slavery times, has rapidly increased.

It is impossible to ascertain the number of slaves imported into America. The estimates vary from 4,000,000 to 5,000,000. The larger number is probably an underestimate. These figures do not represent the number shipped from Africa, for 12½ per cent were lost on the passage, one-third more in the "process of seasoning;" so that, out of 100 shipped from Africa, not more than 50 lived to be effective laborers.

Livingstone, who studied the question of slavery most carefully, estimated, that, for every slave exported, not less than five were slain or perished, and that in some cases only one in ten lived to reach America. If the lowest estimate is taken, then not less than 20,000,000 Negroes were taken prisoners or slain to furnish slaves to America. No wonder that many parts of Africa were depopulated.

Though the slave-trade with America has been suppressed, thousands are annually stolen and sold as slaves in Persia, Arabia, Turkey, and central and northern Africa. Wherever Mohammedanism is the religion, there slavery exists; and to supply the demand the slave-trade is carried on more extensively and more cruelly to-day than at any previous time. The great harvest-field for slaves is in Central Africa, between 10° south and 10° north latitude. From this region caravans of slaves are sent to ports on the Indian Ocean and the Red Sea, and thence shipped to Indo-China, the Persian Gulf, Arabia, Turkey in Asia, and even to Mesopotamia, wherever Mussulmans are found. The English at Suakin are a constant hinderance to this traffic; and therefore Osman Digma has so often within the past five years attacked Suakin, and endeavored to take it from the English to hold it as a port from which to ship slaves to Arabia. Other caravans are driven across the desert to Egypt, Morocco, and the Barbary States. Portuguese slave-traders are found in Central Africa, and, though contrary to law, deal in slaves, and own and work them in large numbers. Cameron says that Alrez, a Portuguese trader, owned 500 slaves, and that to obtain them, ten villages, having each from 100 to 200 souls, were destroyed; and of those not taken, some perished in the flames, others of want, or were killed by wild beasts. Cameron says, "I do not hesitate to affirm that the worst Arabs are angels of mercy in comparison to the Portuguese and their agents. If I had not seen it, I could not believe that there could exist men so brutal and cruel, and with such gayety of heart." Livingstone says, "I can consign most disagreeable recollections to oblivion, but the slavery scenes come back unbidden, and make me start up at night horrified by their vividness."

If the chief or pacha of a tribe is called upon for tribute by his superior, if he wishes to build a new palace, to furnish his harem, or fill an empty treasury, he sends his soldiers, armed with guns and ammunition, against a Negro tribe armed with bows and spears, and captures slaves enough to supply his wants.

The territory from which slaves are captured is continually extending; for, as soon as the European traveller has opened a new route into the interior, he is followed by the Arab trader, who settles down, cultivates the ground, buys ivory (each pair of tusks worth about \$500 at Zanzibar or Cairo); who invites others to come,

and when they have become acquainted with the country, and gathered large quantities of ivory, and porters are wanted to carry the tusks to the coast, a quarrel is instigated with the Negroes, war declared, captives taken, — men for porters, women for the harem, — the villages are burned, and the caravan of slaves and ivory takes its route to the coast, where all are sold. We are told on good authority that during the past twenty years more slaves have been sent out than formerly were exported in a century. Wissmann tells us what he has seen : —

"In January, 1882, we started from our camp, — 200 souls in all, — following the road, sixty feet wide, to a region inhabited by the Basonge, on the Sankuru and Lomami Rivers. The huts were about twenty feet square, divided into two compartments, the furniture consisting of caned wooden stools; floor, ceiling, and walls covered with grass mats. Between the huts were gardens, where tobacco, tomatoes, pine-apples, and bananas were grown. The fields in the rear down to the river were cultivated with sweet-potatoes, ground-nuts, sugar-cane, manioc, and millet. Goats and sheep and fowls in abundance, homestead follows homestead in never-ending succession. From half-past six in the morning, we passed without a break through the street of the town until eleven. When we left it, it then still extended far away to the south-east. The finest specimens in my collection, such as open-work battle-axes inlaid with copper, spears, and neat utensils, I found in this village.

"Four years had gone by, when I once more found myself near this same village. With joy we beheld the broad savannas, where we expected to recruit our strength and provisions. We encamped near the town, and in the morning approached its palm-groves. The paths were no longer clean, no laughter was heard, no sign of welcome greeted us. The silence of death breathes from the palm-trees, tall grass covers every thing, and a few charred poles the only evidence that man once dwelt there. Bleached skulls by the roadside, and the skeletons of human hands attached to the poles, tell the story. Many women had been carried off. All who resisted were killed. The whole tribe had ceased to exist. The slave-dealer was Sayol, lieutenant of Tippo-Tip."

Sir Samuel Baker was largely instrumental in the suppression of the slave-trade, and, while the rule of the English and French in Egypt was maintained, slavery was greatly diminished; but, since the defeat and death of Gen. Gordon, the slave-trade has rapidly increased, and is now carried on more actively than at any other time. The only obstacles to this traffic are the presence of Emin Pacha at Wadelai, the English and American missionaries, and English trading-stations on Lakes Victoria Nyanza and Tanganyika.

The slave-traders unite in efforts to destroy Emin Pacha, and to expel the missionaries and all European traders, except the Portuguese, and for this purpose excite the hostility of the Negro against the foreigner. In this they are aided by the Mahdi. The work of the Mahdi is largely a missionary enterprise. The dervishes who accompany his army are religious fanatics, and desire the overthrow of the Christians and Emin Pacha as earnestly as the slave-trader. Religious fanaticism is therefore united with the greed of the slave-trader to drive out the Christians from the lake region.

Aroused by these reports, and influenced by these views, Cardinal Lavigerie, last summer, started a new crusade in Belgium and Germany against slavery and the slave-trade. The cardinal has organized societies, and is raising a large fund to equip two armed steamships for Lake Tanganyika and Lake Nyassa, the headquarters of the slave-trade, and offers, if necessary, to head the band himself. The Pope has engaged in the work, and has sent Catholic missionaries to Central Africa. The slave-trade is carried on with arms and ammunition furnished by all the European traders. Without these arms, the slave-trade could not be successfully carried on, for the Negroes could defend themselves against slave-traders armed like themselves. While the demand for slaves continues, the slave-trade will exist, and will not cease until the factories of European nations are planted in the interior of Africa.

Mineral Wealth of Africa.

We are told in Phillips's "Ore Deposits" that the precious

metals do not appear to be very generally distributed in Africa. I believe that more thorough research will show that this view is incorrect, and that there are large deposits of iron, copper, gold, and other metals in many parts of the continent. Gold is found on the Gold Coast, in the Transvaal, in the Sudan, and in Central Africa, but only worked in surface diggings, excepting in the Transvaal; but near all these washings, gold nuggets of large size, and the quartz rock, have been discovered. In Transvaal the mines were worked a long time ago, probably by the Portuguese, then abandoned and forgotten. Recently they have been rediscovered, and worked by the English. In the Kaap gold-field in the Transvaal, three years ago, the lion and zebra, elephant and tiger, roamed undisturbed in the mountain solitudes, where there is now a population of 8,000, with 80 gold-mining companies, having a capital of \$18,500,000, one-third of which is paid up. Barberstown, the chief mining-town, has two exchanges, a theatre, two music-halls, canteens innumerable, several churches and hotels, four banks, and a hospital. A railroad was opened in December, 1887, from the Indian Ocean towards these mines, 52 miles, and is being rapidly constructed 100 miles farther to Barberstown.

There is reason to believe that gold deposits equal to those of Mexico or California will yet be found in several parts of Africa. Copper is known to exist in the Orange Free State, in parts of Central and South Africa, and in the district of Katongo, south-west of Lake Tanganyika, which Dr. Livingstone was about to explore in his last journey. Rich copper ores are also found in the Cape of Good Hope, Abyssinia, and equatorial Africa. Large and excellent deposits of iron ore have been found in the Transvaal and in Algiers, and a railroad 20 miles long has been built to carry it from the Algerian mines to the sea. Very many tribes in equatorial and Central Africa work both iron and copper ores into different shapes and uses, showing that the ore-beds must be widely distributed.

One of the few large diamond-fields of the world is found in Griqua and Cape Colony, at the plateau of Kimberly, 3,000 feet above the sea. The dry diggings have been very productive; this tract, when first discovered, being almost literally sown with diamonds.

Coal has been found in Zulu-Land, on Lake Nyassa, and in Abyssinia. The latter coal-field is believed to be secondary. Iron, lead, and zinc, and other minerals, have been found in the Orange Free State. Salt-beds, salt-fields, salt-lakes, and salt-mines are found in different parts of Africa.

Railroads.

The peculiar formation of Africa, its long inland navigation, interrupted by the falls near the mouths of its large rivers from connection with the ocean, renders it necessary to connect the ocean with the navigable parts of the rivers by railroads.

The Belgians will soon construct a railroad on the southerly side of the Kongo, to the inland navigable waters of the Kongo at Leopoldville, following the preliminary surveys lately completed; the French may also construct a road from the coast to Stanley Pool; and by one or the other of these routes the interior of Africa will be opened.

South of the Kongo, the Portuguese are constructing a railroad from Benguela into the interior. In Cape Colony railroads have been constructed in different directions, connecting the greater part of the British possessions with the Cape of Good Hope. They are also constructing a railroad from Delagoa Bay to the mines in Transvaal.

Sudan and the upper waters of the Nile can only be opened to a large commerce by a railroad from Suakin to Berber, about 280 miles. Surveys were made for this road, and some work was done upon it, just before Gen. Gordon's death. The navigation of the Nile above Berber is uninterrupted for many hundred miles. Below Berber the falls interrupt the navigation. The route from Gondokoro down the Nile is by boat to Berber, camel to Assuan, boat to Siut, and railroad to Cairo and Alexandria, making a route so circuitous that it prevents the opening of the Sudan to any extensive commerce.

In Algiers there are 1,200 miles of railroad, and more are being constructed. The French are also constructing a railroad from

the upper part of the Senegal River to the head waters of the Niger. The English have organized a company to construct a road from the Gold Coast to the mines in the interior.

It will thus be seen that the railroad has already opened a way into Africa that is sure to be carried on more extensively.

Stanley Expedition.

There are two methods of exploring Africa. One is where an individual, like a Livingstone or a Schweinfurth, or Dr. Junker, departs on his journey alone. He joins some tribe as far in the interior, on the line of exploration, as possible; lives with the tribe, adopting its habits and manner of life, learning its language, making whatever explorations he can; and, when the region occupied by such tribe has been fully explored, leaves it for the next farther on. This plan requires time and never-failing patience; but in this way large portions of Africa have been explored. The other way, adopted by Cameron, Stanley, Wissmann, and the Portuguese explorers, has been to collect a party of natives, and at their head march across the continent.

"An immense outfit is required to penetrate this shopless land, and the traveller can only make up his caravan from the bazaar at Zanzibar. The ivory and slave traders have made caravanning a profession, and every thing the explorer wants is to be found in these bazaars, from a tin of sardines to a repeating-rifle. Here these black villains the porters—the necessity and despair of travellers, the scum of slave-gangs, and the fugitives from justice from every tribe—congregate for hire. And if there is any thing in which African travellers are for once agreed, it is, that for laziness, ugliness, stupidity, and wickedness, these men are not to be matched on any continent in the world." Upon such men as these Stanley was obliged to depend.

Though travelling in this way is more rapid than the other, it is very expensive, and has many difficulties not encountered by the solitary traveller. The explorer always goes on foot, following as far as possible the beaten paths. A late traveller says: "The roads over which the land-trade of equatorial Africa now passes from the coast to the interior are mere footpaths, never over a foot in breadth, beaten as hard as adamant, and rutted beneath the level of the forest-bed by centuries of native traffic. As a rule, these foot-paths are marvellously direct. Like the roads of the old Roman, they move straight on through every thing,—ridge and mountain and valley,—never shying at obstacles, nor anywhere turning aside to breathe. No country in the world is better supplied with paths. Every village is connected with some other village, every tribe with the next tribe, and it is possible for a traveller to cross Africa without being once out of a beaten track."

But if the tribes using these roads are destroyed, the roads are discontinued, and soon become obstructed by the rapid growth of the underbrush; or, if the route lies through unknown regions outside the great caravan-tracks, the paths are very different from those described by Mr. Drummond, for the way often lies through swamps and morass, or thick woods, or over high mountain-passes, or is lost in a wilderness of waters.

The great difficulty in these expeditions is to obtain food. As supplies cannot be carried, they must be procured from the natives. Very few tribes can furnish food for a force of six hundred men (the number with Stanley); and when they have the food, they demand exorbitant prices. Often the natives not only refuse food to the famished travellers, but oppose them with such arms as they have; and then it is necessary, in self-defence, to fire upon them.

The greatest difficulty the explorer meets comes either directly or indirectly from the opposition of the slave-trader. Formerly the slave-trader was not found in equatorial Africa; but, since the explorer has opened the way, the slave-trader has penetrated far into the interior, and he is continually throwing obstacles in the way of the entry of Europeans into Africa. When it was decided that Stanley should relieve Emin Pacha, he was left to choose his route. He met Schweinfurth, Junker, and other African travellers, in Cairo. They advised him to go by his former route directly from Zanzibar to the Victoria Nyanza. The dangers and difficulties of this route, and the warlike character of the natives, he well knew. The route by the Kongo to Wadelai had never been travelled, and he thought the difficulties could not be greater than by the old route; and, beside,

he proceeded much farther into the interior by steamer on the Kongo, which left a much shorter distance through the wilderness than by the Zanzibar route. On arriving at Zanzibar, he made an arrangement with Tippoo-Tip, the great Arab trader and slave-dealer, for a large number of porters. They sailed from Zanzibar to the Kongo, where Stanley arrived in February, 1887. He then sailed up the Kongo, and arrived in June at the junction of the Aruvimi with the Kongo, a short distance below Stanley Falls. Stanley believed that the Aruvimi and the Welle were the same stream, and that by following up this river he would be on the direct route to Wadelai. Subsequent investigations have shown that he was mistaken. About the 1st of July he left the Kongo, expecting to reach Emin Pacha in October, 1887. No definite information has been received from him from that time to the present. He left Tippoo-Tip in command at Stanley Falls, expecting that a relief expedition would follow. There were great delays in organizing this expedition, from the difficulty of obtaining men, and it was thought that Tippoo-Tip was unfaithful. The men were finally procured, and the expedition left Aruvimi in June, 1888, under command of Major Barttelot. A day or two after they started, Major Barttelot was murdered by one of his private servants. The expedition returned to the Kongo, and was re-organized under Lieut. Jamieson. He was taken ill, and died just as he was ready to start, and no one has been found to take his place; and that relief expedition was abandoned. Reports say that Stanley found the route more difficult than he anticipated; heavy rainfalls, rivers, swamps, and marshes obstructed the way; that the season was sickly, and a large part of his followers died long before he could have reached Tanganyika.

The reports of his capture, and of his safe return to the Aruvimi River, are known to all. These may or may not be true. Although we have not heard from Stanley for a year and a half, yet it by no means follows that he is dead; for Livingstone, Stanley, and other explorers have been lost for a longer time, and have afterward found their way back to the coast. No man has greater knowledge of the country through which his route lay, or of the character of the natives, or the best manner of dealing with them. Emin Pacha was encamped quietly for nearly two years at Wadelai; and Stanley, in like manner, may have been compelled to remain at some inland point and raise his own provisions.

The Future of Africa.

It is impossible to prophesy the future of any country, much less that of Africa, where the physical features have left so marked an impression upon its inhabitants, and where the animal life is so different from that of the other continents. It is rather by differentiating Africa from other countries that we obtain any data from which to form an opinion of its future.

Africa, as we have seen, is surrounded by a fringe of European settlements. What effect will these settlements have upon Africa? 1st, Will the European population penetrate the interior, and colonize Africa? 2d, Will it subjugate or expel the Africans, or will they fade away like the Indians of our country? 3d, If colonization by Europeans fail, will the African remain the sole inhabitant of the country as barbarian or civilized?

Egypt is now controlled by the English, but its climate is too unhealthy, and its surrounding too unfavorable, for Englishmen; and we may safely assume that their occupation will be temporary, or, if permanent, not as colonists. They will remain, as in India, foreigners and rulers, until the subjugated people rise in their power and expel them, and return to their old life. The English rule, though possibly beneficial to Egypt, is hated by the natives, who demand Egypt for the Egyptians.

Leaving Egypt, we pass an uninhabitable coast, until we come to the French colonies of Algiers. It is nearly sixty years since the French took possession of Algiers. There has been a large emigration from France; but the climate, while excellent as a winter climate for invalids and others, is unfavorable for a permanent habitation, especially for infants. The births in one year have never equalled the deaths. When Algeria was first conquered by the French, it was a wilderness, but is now a garden. The cultivation of the grape has been most successful, and extensive iron-mines have been opened. The French are gradually pushing their way from Algiers across the desert to Timbuctoo, and also from Sene-

gambia to Timbuctu. The expense of maintaining the colony has greatly exceeded any revenue derived from it. Though many doubt the political wisdom of retaining it, yet the French have too much pride to acknowledge that the enterprise has been in any way a failure; and they will undoubtedly hold it, and perhaps found an empire. Senegambia and the coast of Guinea, claimed by the French and English, are low and moist, filled with swamps and lagoons, and will prevent any European colonization.

South of the Kongo, the Portuguese claim a wide section of country running across Africa. They have occupied this country over two hundred years. They have done little towards colonizing, and only hold a few trading-posts on the coast and in the interior, dealing principally in slaves, ivory, and gold; and it may well be doubted whether, without holding slaves, they have the stamina or ability to colonize this country, or to produce any permanent impression upon it.

The south portion of Africa, from the 18th parallel on the Atlantic to the 26th parallel on the Indian Ocean, is generally fertile; and the climate is favorable to Europeans, and is capable of sustaining a large population. The growth of Cape Colony has been very slow, but a more rapid growth is anticipated. We believe it will be permanently occupied by the English, who will dispossess the aborigines, and form a great and permanent English state. The coast of Zanzibar, occupied by the Germans and English, is rich and fertile, the climate unhealthy; but when the mountain-ranges are crossed, and the elevated plateaus and lake regions are reached, the interior resembles the Kongo region. Massaua and Suakin, on the Red Sea, are unhealthy and worthless, unless connected by railroad with the upper Nile.

There remains equatorial Africa, including the French settlements on the Ogowe, the region about Lake Chad, the Kongo and its tributaries, and the lake region. The more we learn of equatorial Africa, the greater its natural advantages appear to be. The rivers open up the country in a favorable manner for trade and settlement. Its elevation from 2,000 to 3,000 feet will, I believe, render it healthy, though this elevation is only equal to from ten degrees to fourteen degrees of north latitude. Here all the fruits of the torrid zone, the fruits and most of the grains of the temperate zone, cotton, India-rubber, and sugar-cane, are found.

The country has been unhealthy, a great many Europeans have died, and few have been able to remain more than two or three years without returning to Europe to recuperate. These facts seem to show that the climate is not healthy for Europeans. But, by reason of the exposure incidental to all new settlements, the mortality has been much greater than it will be when the country is settled and the unhealthy stations have been exchanged for healthier localities. Every new country has its peculiar dangers, which must be discovered and understood, then overcome. I believe that these obstacles will be overcome, and that Europeans will occupy all this region, and that it will become a European colony.

If European colonization is successful, European civilization will come into contact with African barbarism. Where such a contest is carried on in a country where the climate is equally favorable to the two races, it can only result in the subjugation or destruction of the inferior race. If the climate is unfavorable to the white population, then, unless the inferior is subjected to the superior, the white population will fail in colonizing the country, and the Negro will either slowly emerge from barbarism, or return to his original degraded condition.

The Negroes have never developed any high degree of civilization; and when they have lived in contact with civilization, and made considerable progress when that contact ceased, they have deteriorated into Barbarists. But, on the other hand, they have never faded away and disappeared, like the Indian of America and the natives of the Southern Archipelago.

Nature has spread a bountiful and never-ending harvest before the Negro, and given to him a climate where neither labor of body or mind, nor clothing, nor a house, is essential to his comfort. All nature invites to an idle life; and it is only through compulsion, and contact with a life from without, that his condition can be improved.

In Africa there is going on a contest between civilization and

barbarism, Christianity and Mohammedanism, freedom and slavery, such as the world has never seen. Who can fail to be interested in the results of this conflict? We know that Africa is capable of the very highest civilization; that it was the birthplace of all civilization. To it we are indebted for the origin of all our arts and sciences, and it possesses to-day the most wonderful works of man. I believe that Africa, whose morning was so bright, and whose night has been so dark, will yet live to see the light of another and higher civilization.

BOOK-REVIEWS.

Hypnotism or Mesmerism. By CHARLES B. CORY. Boston, Mudge. 12°.

COMPARATIVELY little has been done in this country in the study of hypnotism, now occupying so prominent a place in the literatures of France, Germany, and other countries. It is the object of Mr. Cory, who is chairman of the committee on hypnotism, of the American Society for Psychical Research, to inform the American public with reference to those phenomena. Most of the papers here gathered together have been published separately, and the collection forms a very readable introduction into some aspects of the subject. A general paper on hypnotism, partly historical and partly expository, is followed by the most valuable of the papers, in which the factor played by the consent of the subject in the act of hypnotization is ingeniously analyzed. He shows, in one case, that the most intense efforts to will a patient to sleep, when the latter is unaware of the attempt, prove unavailing; while entire passivity is sufficient to cause sleep, when the subject has been led to believe that an attempt to hypnotize her is being made. Mr. Cory sums up his conclusions thus: (1) hypnotism is related to an abnormal constitution of the nervous system; (2) only a small percentage of persons are hypnotizable; (3) the condition is entirely due to suggestion, no one being hypnotizable without being informed, or led to suspect, that he is to be the object of experiment; (4) the condition may be self-induced; (5) in certain cases the hypnotic is insensitive. Mr. Cory's experiments on negative hallucinations are extremely ingenious. He shows, that, when an object is removed by suggestion from the field of vision, the subject takes note of some peculiarity by which to recognize that she is to ignore it. What the eye sees, the mind refuses to recognize. If a number of precisely similar objects are presented, the subject has no longer a clue as to which impression is to be ignored, and the suggestion fails. Mr. Cory has also a talk upon the therapeutic value of hypnotism.

AMONG THE PUBLISHERS.

THE new "Century Dictionary," which has been in course of preparation by The Century Company during the past seven years, is approaching completion, and it is expected that the issue of the work will begin during the coming spring. It will be published by subscription, and in parts, or "sections;" the whole, consisting of about 6,500 pages, to be finally bound into six quarto volumes. Although the printers have been engaged upon the type-setting for more than two years, the publishers have waited until the labor of making the plates is so well advanced that the work can be regularly issued at intervals of about a month, and completed within two years. Probably no work of greater magnitude or importance has been put forth by an American house. The editor-in-chief, Professor William Dwight Whitney of Yale University, who is perhaps the highest authority in philology in both America and England, has been assisted by nearly fifty experts, college professors, and others, each a recognized authority in his own specialty; the design of the dictionary being to make it complete and authoritative in every branch of literature, science, and the arts. It is intended that the botanist shall find in the "Century Dictionary" full definitions of terms in his special line of study; that the civil engineer and the architect can turn to it for the definitions (usually with plans and pictures) of the terms in their own specialties; and so with every other pursuit or profession, — law, music, medicine, chemistry, anatomy, archaeology, zoölogy, mineralogy, theology, etc. Each expert is reading the proofs of the entire work; indeed, the

proofs are read by more than sixty people. For seven years not fewer than a hundred persons, and sometimes more, have been working upon this dictionary. Trained readers have been searching the fields of English literature for words, and uses of words, and quotations. Over two thousand authors will be quoted; and it is understood that American books, and even the current literature of the magazines, have been liberally drawn upon. The growth of the English language at the present day is astonishing. It is said that the new "Encyclopædia Britannica" alone furnished ten thousand new words to be defined in the "Century Dictionary." These were generally technical words, which had been coined by the writers of articles in the "Encyclopædia;" but nevertheless they are now born into the language, and are liable to be met with in any one's reading. The new dictionary will contain definitions of probably two hundred thousand words, and these without including any useless compounds. Thousands of quotations, from the vast store which the readers have gathered, will help to illustrate the uses of these words. The work is encyclopedic; that is, encyclopedic in the sense that it gives, in addition to definitions and the etymological history of words, a very great amount of detailed information which has hitherto been found only in the encyclopædias, and often not even in them. There will be about six thousand cuts in the text, the subjects of which have usually been chosen by the experts in charge of the special departments. They have been drawn, whenever possible, from the object itself, and engraved under the supervision of the Art Department of The Century Company. The engravings are said to be of a higher class than have yet found place in any work of this character. It is understood that all rights have been obtained for the issue of this dictionary throughout the English-speaking world, and that it will be published in England simultaneously with its issue in this country.

— Messrs. Longmans, Green, & Co. are about to follow Mr. Besant's "Eulogy of Richard Jefferies" with a volume of Jefferies's uncollected papers, under the apt title of "Field and Hedgerow," in which will appear the latest essays of the Englishman who best continued the tradition of White of Selborne. Among the subjects are "Hours of Spring," "The Makers of Summer," and "Time of Year," which are treated with the sympathy and the knowledge that lead a critic to call Jefferies "the English Thoreau."

— The article on "Walter Scott at Work," by E. H. Woodruff, in the February *Scribner's*, will contain facsimiles of many interesting pages from the proof-sheets of "Peveril of the Peak," with the pithy criticisms of Ballantyne and replies of Scott on the margin. This literary treasure was purchased in London twenty years ago by Ex-President Andrew D. White of Cornell, who furnishes an introduction to the article. Bishop Potter of New York, in an essay which will appear in the same number, on "Competition in Modern Life," says, "Let us understand, then, that competition—a strife to excel, nay, if you choose, downright rivalry—has a just and rightful place in the plan of any human life. A prize-fight is probably the most disgusting spectacle on earth, but it has in it just one moment which very nearly approaches the sublime; and that is when the combatants shake hands with each other and exchange that salutation as old as the classic arena, 'May the best man win.' It is the equitable thing that the best man should win." George H. Jessop, the playwright, will contribute the story of an Irish outrage, called "The Emergency Men," told from the landlord's point of view. C. D. Gibson, of *Life*, will illustrate it. In an article on "The Physical Development of Women," which Dr. D. A. Sargent of Harvard College will contribute, he says, "At the present time women as a class have more leisure than men for self-improvement, and we must look to them to help on the higher evolution of mind and body, not only in perfecting themselves, but in helping to perfect others. Already three-fourths of the school-teaching force in the United States is composed of women, and they will soon be in the majority as instructors in physical training. The gospel of fresh air and physical improvement is being slowly imbibed by our best families, and the stock of fine specimens of physical womanhood is slowly and steadily improving." W. C. Brownell, whose articles on "French Traits" have received a great deal of discriminating praise, will contribute the last of the group, which discusses

"The Art Instinct." The essays, with several not heretofore printed, will soon be published in book-form. Thomas Sergeant Perry will describe an interesting collection of Græco-Egyptian portraits discovered in 1887 near Fayoum. Professor Ebers believes that some of them were painted three or four centuries before the Christian era. The article is to be fully illustrated from photographs of the originals.

— Messrs. Dodd, Mead, & Co. have issued a catalogue of books, including some of exceeding rarity, such as perfect specimens from the presses of William Caxton, Wynkyn de Worde, and Richard Pynson; a unique copy of the original folio edition of Ben Jonson's works, printed on large paper, with autograph inscription; the original quarto edition of Sidney's "Arcadia;" also the original manuscript of W. H. Ireland's "Shakesperian Forgeries" (numbering 174 lots), together with other desirable rare and choice books. This firm is at all times ready to price, and desirous of purchasing, good books. They are paying special attention to rare books, especially those relating to the early history of America, and would be glad to hear from any one who has books of real value, of which the owner may for any reason wish to dispose.

— Messrs. Cupples & Hurd, Boston, announce for immediate publication "The Eggs of North American Birds," by C. J. Maynard. Such a book has long been needed by students on oölogy, for there is no work upon the subject by any American author which can be called complete. The book begins with the descriptions of the eggs of the water-birds, and the species are numbered as in the "List of the American Ornithologists' Union," the nomenclature being the same so far as it is there given; but every species and subspecies that have been described up to date are included, considerably augmenting that list. All known eggs are described, and the description of each is given so clearly as to render it readily distinguishable. In case of rarities, this is often accomplished by comparison with some well-known species, or with the figured type, of which there are eighty, contained in ten plates, carefully drawn on stone by the author, and accurately colored by hand by Mrs. Maynard. The dimensions of the largest and smallest of a large series of the eggs of each species, number of eggs deposited, nesting-time, breeding-range, and description of nests, are given. At this late day, it is perhaps needless to state that the author has pursued his usual course in preparing the text of the work, and has never used a technical term when a simple one would answer. As a consequence, the descriptions are at once available to all classes of students. The work will be complete in eight parts, each part containing a description of seventy species, more or less, and at least one or two hand-colored plates. The entire work, it is expected, will be completed by the 1st of May, 1889. Sold only by subscription.

— Edward Allen Fay's "Concordance of the Divina Commedia" (Boston, Little, Brown, & Co.) is published under the auspices of the Dante Society, of which James Russell Lowell is president, and Charles Elliott Norton is vice-president. It was reviewed at length in the *Nation* for Oct. 25, 1888. The reviewer closed by saying, "Dr. Fay has put on the titlepage of his book the motto 'In che i gravi labor gli sono aggrati.' It well denotes the loving and accurate care with which he has performed his heavy task. His book—the first of its kind in centuries—is not for a day: full generations of lovers and students of Dante will place it on their shelves beside the 'Divina Commedia.'"

— Max O'Rell's book on the United States, which has been awaited with so much eagerness, will be published toward the end of this month by Messrs. Cassell & Co. It will be issued in Paris and London at about the same time. M. Calmann Levy, who publishes the book in France, has already taken advance orders for forty thousand copies; the English outlook is quite as good; and in this country there is every reason to anticipate a sale far exceeding that of England or France. Messrs. Cassell & Co. have paid M. Blouet (Max O'Rell) the largest lump sum that has ever been paid a foreign author for the right of publication in this country. The title of this book is "Jonathan and His Continent; Rambles through American Society," by Max O'Rell and Jack Allyn. The work of translating has been admirably done by Madam Blouet,

who is an English woman and a thorough French scholar. One who has had the privilege of glancing over the proof-sheets of Max O'Rell's book pronounces it the brightest thing he has done, and predicts that it will make a much greater sensation than "John Bull and His Isle," great as was the commotion caused by that clever skit. In giving his impressions of society in the United States, Max O'Rell is often severe, but always kind. He makes a number of statements, however, that are going to call forth contradictions in various quarters, and are likely to stir up some strong criticisms. Each of the great cities that he visited — Philadelphia, Boston, Chicago, etc. — is honored by a special chapter. American women are also so honored, and their beauty is highly complimented; but this will hardly atone in their eyes for the charge brought against them of being badly dressed. Altogether the book is very lively reading, and will unquestionably excite the interest of every American citizen who wants to know what a keen-eyed, intelligent, and witty Frenchman has to say of him and of his country.

— Although the privilege of reprinting in book form the series of papers on "Authors at Home," which appeared in *The Critic*, was requested by a number of publishing-houses, it was the good fortune of Cassell & Co. to secure it. These articles are not mere gossiping sketches. While they are bright and interesting, they have the advantage of authorization as to facts of biography, as each author selected the person to write of him, or gave his approval where the selection was made by the editors. Messrs. Cassell & Co. wish to call attention to the fact that they intend to issue three editions of this book, — a thing unusual in the book-trade. The first will be a regular library edition at \$1.50, while the other two will be "limited" to one hundred copies each. One of these will be an *édition de luxe*, on heavy paper with generous margin, and handsomely bound, while the other will be on large paper especially prepared for "extra illustrating."

— Lee & Shepard will publish at once "Aryas, Semites, and Jews, Jehovah and the Christ," by Lorenzo Burge, author of "Pre-Glacial Man."

— George Routledge & Sons will publish shortly translations of Daudet's "Recollections of a Man of Letters," and Guy de Maupassant's "Sur L'Eau" ("Afloat"). Both volumes will be illustrated.

— Cupples & Hurd have in preparation a new edition of "The Naturalist's Guide," by C. J. Maynard; and also a new work by the same author entitled "Eggs of the Birds of the United States," illustrated by the author, to be issued in monthly parts.

— Charles Scribner's Sons have in press Dr. James McCosh's "First and Fundamental Truths: a Treatise on Metaphysics," which is regarded as the crowning philosophic work of this venerable author's long and fruitful life. They have also in hand a volume of musical essays by Henry T. Fink, the musical critic of the New York *Evening Post*, and author of "Romantic Love and Personal Beauty;" a limited edition of 500 copies of Lester Wallack's "Memories of Fifty Years;" and the Dudleian lecture on "The Validity of Non-Episcopal Ordination," delivered at Harvard University, on Oct. 28 last, by Professor George Park Fisher.

— Macmillan & Co. have in press a new work on Darwinism, by Dr. Alfred Russell Wallace, which promises to have much scientific significance. The first volume in their new English Men of Action Series will be "Gen. Gordon," by Sir William Butler. A volume will be issued each month.

— Harper & Brothers have just ready "A Latin Dictionary for Schools," by Charlton T. Lewis, the editor of "Harper's Latin Dictionary." It is not an abridgment, but an entirely new and independent work, designed to explain every word or phrase in the Latin literature commonly read in schools; viz., the complete works of Cæsar, Terence, Cicero, Livy, Nepos, Vergil, Horace, Ovid, Juvenal, Phædrus, and Curtius, the Catiline and Jugurtha of Sallust, the Germania and Agricola of Tacitus, and a few words found in some extracts of Florus, Eutropius, and Justinus. The original meaning of every word is first given, and then the modifications which it underwent in usage. The editor has preferred illustrations drawn from the earliest authors read by the students, — Cæsar's Gallic War, Cicero's Orations against Catiline, and the first books

of Vergil's *Æneid*. The general plan of the work was not finally adopted until after consultation with thirty of the leading Latin scholars and teachers in the country.

— W. H. Morrison, Washington, D.C., has just published the fourth volume of Mr. James Schouler's "History of the United States under the Constitution." The period covered is 1831-47, and the fifth (and perhaps concluding) volume, which will break off at 1861, is now in active preparation.

— Rénan has completed the second volume of his "History of the Jews." There is one more volume to come.

— Noah Brooks has written an article on the explorer Henry M. Stanley, whose real name he claims is John Rowlands. The article will appear in the February issue of the *St. Nicholas*, and will be illustrated with a new portrait of the explorer, maps, etc.

— The February instalment of the "Lincoln History," in *The Century Magazine*, will contain chapters of peculiar interest, describing (1) the events leading up to the final removal of Gen. McClellan; (2) the financial measures undertaken by Mr. Chase and advocated by Mr. Lincoln for carrying on the war; (3) the relations between President Lincoln and Secretaries Seward and Chase, including the incident of the simultaneous resignation of the two secretaries, and the manner in which Mr. Lincoln averted a political catastrophe.

— The Yankee dialect made famous in Lowell's "Biglow Papers" is now scarcely to be heard in New England, save in odd corners like the home of "Cape Cod Folks," or in the mountain fastnesses in New Hampshire, or among the Berkshire hills. A new writer, Ella Loomis Pratt, who has done some clever sketches from the last-named region in the columns of the *Springfield Republican* and other journals, has treated that life and dialect in a full-fledged novel, "A Gentleman of Fairden," which is announced as a feature of *The Literary News*, New York, for 1889. It is said to abound in pleasant and humorous pictures of places and people in the Berkshires.

— The Open Court Publishing Company, Chicago, have just issued a little pamphlet entitled "Artificial Persons: A Philosophical View of the Law of Corporations," by Charles T. Palmer. The author of this pamphlet is one of the few persons who think that corporations do not have privileges enough. His central thesis is, that a corporation ought to have and exercise all the rights and privileges that belong to a private partnership. He is specially displeased with the rule of law established by the United States Supreme Court, that a corporation chartered by one State cannot exercise corporate privileges in another State unless chartered by that other State also. But his arguments seem to us decidedly weak and inconclusive. A corporation owes its existence to its charter; and its members, in accepting the charter, accept all the conditions and restrictions which that instrument imposes, the chief of which is that they can do nothing but what their charter gives them permission to do. Having accepted these conditions, they have no right afterwards to complain of them. Instead of being a "philosophical view," Mr. Palmer's theory strikes us as both unphilosophical and impolitic.

— The *Family Mail-Bag* is the title of a monthly periodical published at 140 Nassau Street, New York. It is intended for the amusement and instruction of the whole family, and contains an interesting collection of good reading. The January number is the second that has been issued.

— Charles Waldstein's paper on "Ruskin's Work — its Influence upon Modern Life and Thought," will appear in *Harper's Magazine* for February, with a portrait of Ruskin as the frontispiece. In the same number will be printed "A Russian Village — an Artist's Sketch," by Verestchagin.

— Miss Mary F. Seymour's new paper, the *Business Woman's Journal*, which made its first appearance week before last, is devoted to the interests of all women, especially those who work either with brains or hands. It advocates higher education and the adoption of some avocation by every woman whose time is not taken up in household duties, and generally seeks to present the woman's side of every question.